APRIL 11, 1946

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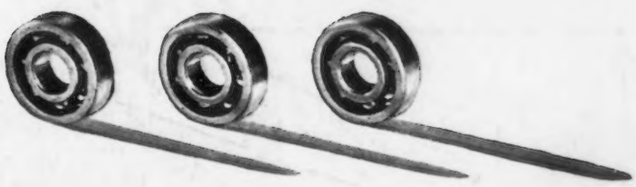
THE

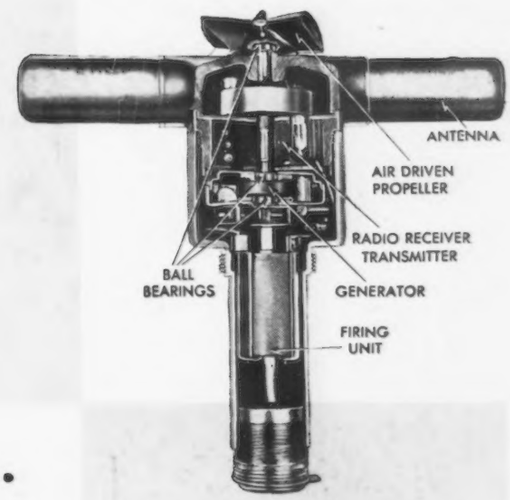
IRON AGE

APR 12 1946

Three little ball bearings



...and how they flew at 100,000 RPM!



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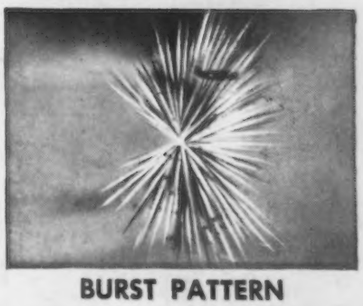

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Test of Quality

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Try This on Your ROLLING AND BENDING MACHINES

This moulding with intricate cross-sectional contour and a 90-degree corner bend was roll-formed from Sharon Stainless Type 430 (.018 gauge), a straight-chromium grade.

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"As Steel Goes, So Goes the Nation"

ROMANCE and drama are where you find them, but you have to know where to look. And as a rule, unless you are a very exceptional individual, which most of us are not, somebody has to tell you where to look.

Take steel for example. To most people outside of our metalworking industry, and to some who are on the inside, steel is steel. A long established, useful material produced by a conservative industry and something that is an essential material for building bridges, skyscrapers and railroads and for making pots, frying pans and ten thousand useful and established products.

Steel, like grandpa, has been with us for a great many years and like grandpa, is perhaps taken for granted. We do not expect grandpa to kick up his heels and compete with the youngsters. We look upon him as a conservative, reliable, slow moving and sedate person who is predictable. His performance capacity is established. You do not expect him to perform miracles, even under the urgency of war.

That is where some of you will be surprised if you read "Steel in the War," recently written by Douglas A. Fisher and published by the United States Steel Corp. And if you are either a producer or a user of steel, you should read it, for "as steel goes, so goes the nation" and steel is evidently going places.

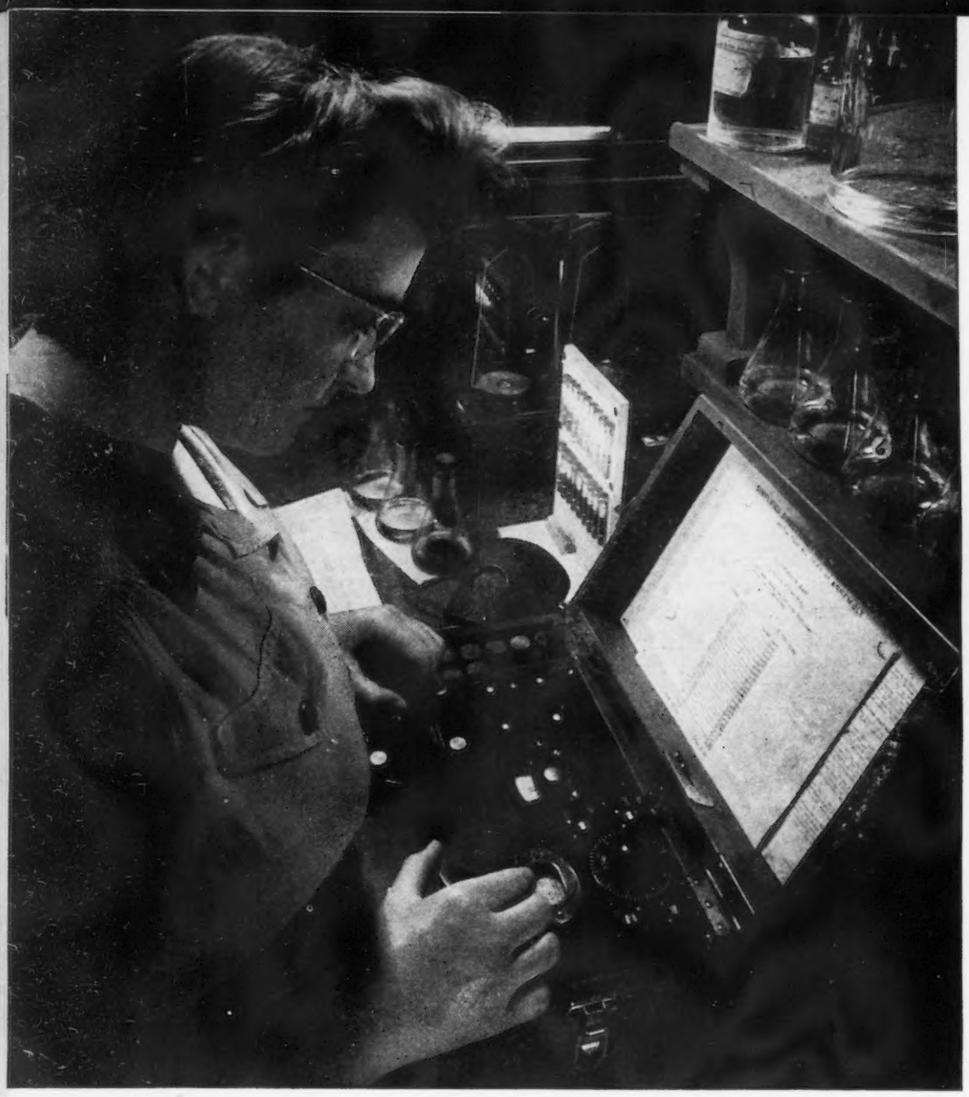
What the steel industry did to revolutionize itself to meet the demands of war, and that is told in this book, is prophetic, I think, of what it can and will do to meet the demands of peace, which are not by any means less exacting in this fast moving world of 800-miles-per-hr planes and atomic energy. And the users of this basic material have not only a right but a duty to ascertain how far and how fast this industry is prepared to go with them in meeting the demands of a new and more exacting world for better products.

During the war years, our American industry, we are told in this book, produced a total tonnage of nearly half a billion tons of steel. That's enough steel to equal four tons for every foot of the circumference of the world at the equator or to build a super highway from the earth to the moon at 2000 tons per mile, if you could find anchorage for the piers on the asteroids.

But the quantitative performance is the least part of this story. War steel is not just steel as we are prone to think of this material. War steel is not steel but steels. A thousand different varieties, each one suited to its individual and differing requirement. Many of these demanded qualities unheard of before the war but which war has now made available for peacetime products. If the old saying holds true and the nation goes as far and as fast in the coming postwar years as the steel industry, thanks to its metallurgists, production engineers and managers have made it go during the war years, our future industrial progress is indeed assured.

As Irving S. Olds, chairman of U. S. Steel, well expresses it in his foreword, "It is our earnest wish that those who read 'Steel in the War' may take pride in the contribution of the steel industry and may draw therefrom a renewed faith in the destiny of this nation."

I think you will.



Slag tests, far faster than chemical analyses, help Inland control the quality of steel.

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Four or more times during each open hearth heat, slag samples of many grades of steel are taken, crushed, and dispatched, through a network of pneumatic tubes, to the Inland laboratory. Within a few minutes after the receipt of each sample, a laboratory technician, using a special, fast method for determining slag characteristics that has been highly developed by Inland, dispatches the result of the slag test back to the open hearth.

Inland has turned progressive slag tests into one of the most important and useful methods for continuous control of the process of steelmaking in open hearth furnaces. Inland Steel Company, 38 S. Dearborn St., Chicago 3, Ill.

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► Use of gas turbines for ship and locomotive propulsion is much nearer realization than is commonly believed. The Big Six eastern bituminous coal hauling railroads are prepared to ask for bids on a new type locomotive featuring a soft coal-fired gas turbine-electric drive.

Backers of the turbine locomotive speak in terms of a thermal rail efficiency of 20 pct with the gas turbine at 1350° F, as compared with 30 pct for diesel and 7.5 pct for steam. But, of course, the sharply lower Btu cost of coal is expected to result in pronounced operating economies.

► Inability to obtain SAE 1040 carbon steel has forced at least one, if not more large steel user to specify NE 8640 instead, if assembly lines are to be kept rolling.

► Gas-fired radiant tube makers are now talking about the development of heats as high as 2300° to 2400° F to be used with special atmospheres. In fact they have already received an inquiry for heating steel forging stock up to 2300° F in reducing or nonscaling atmospheres with the hope that die life can be extended, and forgings can be held to closer tolerances with better surface condition.

► Canada's steel price rise of $5 to $6, made effective April 1, applies to all products containing iron and steel. For the Steel Co. of Canada the price rise is equivalent to $10 a ton for its steel distribution in the Toronto area. In the price rise granted in 1942 the company's Toronto sales were excluded.

► Ford is installing a new U-shaped truck assembly line at Highland Park with a daily capacity of 500 trucks--a little more than twice the capacity of the truck line currently in use at the Rouge. The present Rouge truck line will be used for passenger production.

► Producers of fine steel wire foresee wide expansion in peacetime demand for this product. Utilizing wartime expanded capacity, wire mills are expecting heavy demand for tire wire, for recording wire, electronic devices and for special purpose wire brushes. They are confident of meeting import competition on a quality basis.

To eliminate cleaning, coating and extra handling in fine wire drawing, process wire is bright annealed in a protective atmosphere. In the case of certain grades of coated wire, liquor coating (copper-tin) is placed on the rod and drawn down to final annealing size, annealed under gas, removed from pits and taken directly to the wet drawing room.

► As a means of revealing hidden weaknesses, or conversely of indicating areas of excessive strength with resultant overweight, the electric strain gage is proving an invaluable tool in the hands of structural and machine designers.

Operation of the gage is based on the fact that when resistance wire is stretched or elongated, the electrical resistance of the wire increases in proportion to the stretch. Similarly when compressed or pushed together from both ends, the resistance decreases proportionately.

► Despite a reported millions of pounds worth of orders on the books of the Austin Motorcar Co., the firm's factory at Birmingham is working at not more than 60 pct of capacity. Production for one week in March totaled 1519 cars, and despite the limited scale, Austin has built more actual units than any other manufacturer since the end of last August.

The firm is warning its stockholders that, although the present order position is extremely favorable, lack of delivery of materials and continuing restrictions may prevent many of these orders from ever being delivered.

► A recent census of industrial research in Britain disclosed that at present some 9000 graduate scientists are engaged in research and development in British industry. The total expenditure on this work is about $8,000,000 annually, and plans already announced indicate a 25 pct increase in research activities by many industries.

Measuring Eccentricity of Welding

MANUFACTURERS of welding electrodes are constantly striving to maintain the concentricity of the core with the coating within limits not exceeding a few thousandths of an inch. The reason for this is that with an eccentric coating the arc has a tendency to burn in one direction preferentially. This has nothing to do with the phenomenon of arc blow and occurs in the case of ac welding just as well as with dc welding. It is clear that manipulation becomes more difficult with eccentric electrodes and that the danger of trapped slag in the weld is more acute. This is particularly the case in semiautomatic welding using so-called touch rods, when the inconvenience caused by eccentricity of the coating is much more pronounced than with normal downhand welding.

Two processes are mainly used for the production of welding electrodes, namely dipping and extrusion. In the case of dipping, concentricity depends to a large extent on the method of clamping the core wires prior to dipping, on the conditions prevailing in the slurry providing the coating, and to a minor extent on the conditions of electrode drying.

The extrusion processes can be subdivided into solid extrusion processes and wound extrusion processes. In the former, the usual method is that of guiding the core wire through a die which is located concentrically within the coating die; the concentricity depends on the accuracy of manufacture of the individual dies and also on the tolerances between wire diameter and wire die. It is not economical to use very narrow tolerances (based on the nominal core wire diameter) as for technical reasons of wire drawing a certain latitude has to be allowed. In the wound extrusion process an asbestos yarn or some other thread is first wrapped around the core wire; it guides this wire on the inner surface of the coating die; the flux which is wetter and much more plastic than for solid extrusion is pressed into the interstices between the individual threads. The coating concentricity in this case depends mainly on the diameter of the wrapping yarn.

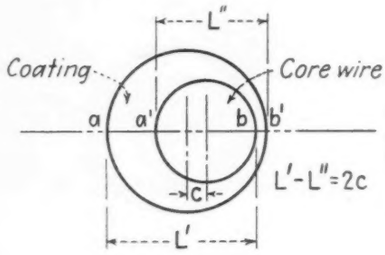

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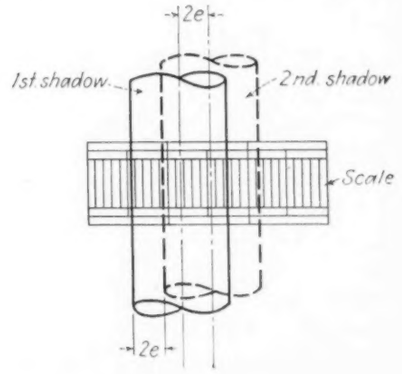
FIG. 1—After stripping the coating at a number of spots, a micrometer may be used to measure the distances between a and b, and between a' and b'. The difference between these two readings will equal twice the eccentricity.

BELOW

FIG. 2—Rotating the electrode on knife edges after stripping two spots on the coating, and using a dial indicator, is another, but destructive, method of checking for concentricity.

BELOW

FIG. 3—Standard optical measuring equipment may be used, in combination with knife edges, to check against a fixed scale by means of shadows.



Although it is possible to control the concentricity during these processes it has been found necessary to check the results from time to time in the course of manufacture.

The simplest way of measuring the eccentricity consists of removing the coating when still soft, with the help of a knife or sharp tool at a number of points on the circumference. Using a micrometer the distance between the points a and b and a' and b' respectively can thus be measured, fig. 1. The difference between these readings corresponds to twice the eccentricity of coating v. core wire. It is necessary to find by trial and error the point at which the minimum of flux surrounds the wire, and the other mea-

Electrode Coatings . . .

By DR. H. P. ZADE

Eccentricity of the coating with the core wire of arc-welding electrodes can be a source of considerable trouble. Manufacturers usually take great pains to insure concentricity, but an occasional check is highly desirable. In this article, originally published in the British journal "Welding," the author describes several methods, both optical and electrical, by which accurate measurements may be made.

surement should then be taken at 180° to this position. This method can be applied only if the coating is still sufficiently soft to be removed with a knife. In the case of dried electrodes, the coating could be removed only by grinding, and there is a certain danger of grinding into the core wire. The accuracy of measurement depends on the skill of the operator, since the micrometer can easily penetrate the soft coating, and it is rather difficult to determine the point of contact between micrometer and a soft coating. The method, therefore, cannot be recommended and is certainly not in line with modern production methods.

Another method practiced by some electrode manufacturers employs the Mercer gage in combination with knife-edges. Part of the coating is removed and the electrode is rotated on the knife edges, a little anvil resting on the coating. The anvil is attached to the dial gage and slight spring pressure exerted so as to keep contact between anvil and coating. The instrument is shown in fig. 2.

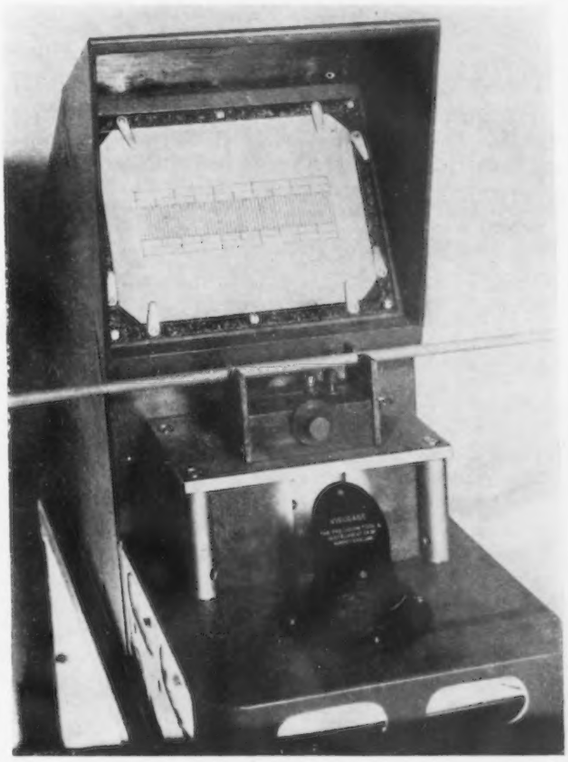
A large number of instruments has been provided in the course of the past few years for the measuring and checking of sizes of small components, such as screws, threads, etc. Some of these instruments use an optical projection system which enables the operator to observe an enlarged shadow of the object under review on a ground glass screen.

A similar scheme can be adapted to the measurement of eccentricity by projecting a shadow of the coating and rotating the electrode around its wire axis by supporting it on V-shaped knife edges. If the electrode is kept vertical the result will be a lateral displacement of the shadow. The width of this displacement after a rotation of the electrode around 180° corresponds to twice the eccentricity, see fig. 3. If the magnification is sufficiently great, e.g., 25 diameters, a reasonable accuracy of measurement can be obtained.

A variation of this method is used by the Arc Manufacturing Co., Ltd., in their works. This method consists of rotating the electrode horizontally on V supports. A little weight-loaded anvil presses slightly against the rotating surface of the coating and the up and down motion of this anvil is transformed by means of a lever into an arcuate displacement of a hair slide. The image of the hair is projected through the optical system at a magnification of 25 diameters. The lever system in itself has an advantage of 2 to 1. The actual magnification is, therefore, 50 x. Fig. 4 shows a photograph of this meter which is self-explanatory. (A Visugage, a standard product of the Precision Tool & Instrument Co., Ltd., was modified for the purpose.)

Since most coatings consist of a mixture of organic and inorganic materials with a density lower than steel, it is possible to take X ray shadowgraphs of electrodes, and show the coatings as a less dense shadow on a fluorescent screen. By rotating the electrode on its coating and using a suitable magnification, eccentricity can be measured in a way similar to the optical measurement, but with the advantage that it is not necessary to destroy part of the coating for this purpose. The question of obtaining sufficient magnification of the shadow is closely related to the grain size of the fluorescent screen and also to the available intensity of radiation. The cost of this procedure is

FIG. 4—A somewhat different optical system reflects the shadow of a hair on a fixed scale. If the coating is eccentric, rotation of the rod will displace a small anvil and cause movement of the hair.



prohibitive and no electrode manufacturer would consider the purchase of an X ray plant for the purpose of checking the concentricity of electrodes.

Chalmer & Tait have developed an instrument for the measurement of the thickness of nonmagnetic coatings on a magnetic base material. Generally speaking, the method is based on balancing the induced voltages corresponding to magnetic fluxes which in turn depend on the thickness of nonmagnetic materials, and reading the amount of unbalance on a sensitive microammeter or galvanometer.

Tait developed an instrument on this principle which is specially adapted to the measurement of coating thickness and eccentricity of arc welding electrodes. Fig. 5 represents the circuit diagram of this instrument and fig. 6 shows a photograph of this magnetic eccentricity meter. A short description of the principle involved is given below:

In the diagram, fig. 5, a welding rod, A, which for this method of measurement must have a ferritic core wire, is covered by a nonmagnetic flux coating B. C is a primary coil inside which the coated rod rests; D1 and D2 are curved armatures of Stalloy, carrying secondary coils E1 and E2, and both free to move so that their open ends rest against the flux coating. Two transformer type circuits are thus set up with the primary coil and welding rod common to both, and gaps in both magnetic circuits brought about by the flux coating on the rod.

If an alternating current is passed through the primary coil, current will be induced in both the secondary coils, the amount depending on the size of the magnetic gaps, that is, of the flux coating on opposite sides of the welding rod.

By connecting the two secondary coils, in opposition through two rectifiers F1 and F2 to a microammeter, G, direct readings of lack of uniformity between the flux coating on opposite sides of the rod can be obtained. By rotating the rod the position of maximum eccentricity can be found.

The instrument can be calibrated by using a bare welding rod and measured nonmagnetic spacers to simulate the flux coating. Further, settings for the rheostat R can be determined for different diameters of rod and thicknesses of flux to give equal microammeter readings for equal changes in the size of gaps. This makes it possible to calibrate the microammeter to read directly the linear departure from concentricity of the flux coating across any chosen diameter.

The advantage of this method is first of all its nondestructive nature. Furthermore, the sensitivity of measurement can be chosen at will and can be made

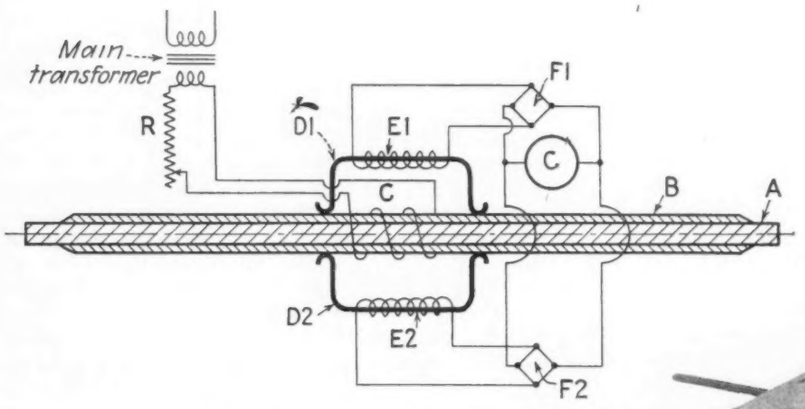


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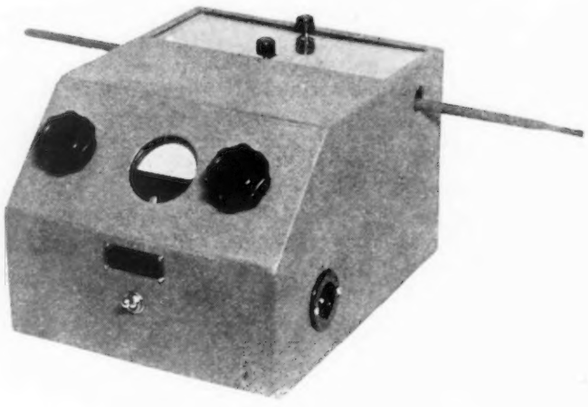
FIG. 5—Circuit diagram of the Tait instrument which measures eccentricity of ferritic electrodes covered with a nonmagnetic coating by nondestructive electrical means.

BELOW

FIG. 6—The actual Tait instrument as constructed by the research laboratories of Arc Mfg. Co., Ltd.



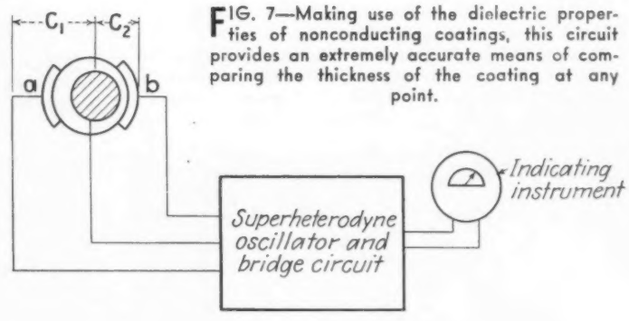
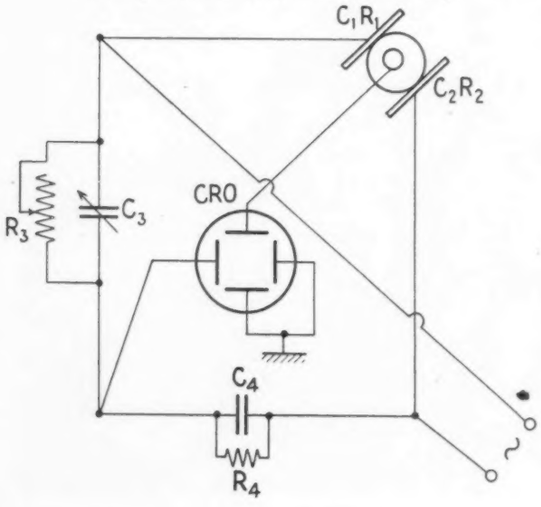


FIG. 7—Making use of the dielectric properties of nonconducting coatings, this circuit provides an extremely accurate means of comparing the thickness of the coating at any point.

FIG. 8—Similar to the circuit shown in Fig. 7, this system employs a cathode ray oscillograph to indicate relative coating thickness, and hence, concentricity.



very high. Its disadvantage consists in the fact that it must be recalibrated for every different type of flux.

Instead of using the magnetic properties of the core wire as in the method just described, it would be possible to make use of the dielectric properties of nonconducting electrode coatings in order to determine their eccentricity. In fig. 7, a diagrammatic arrangement of this idea is shown. The core wire in this case is used as one electrode, and two external metallic electrodes make contact with the surface of the coating. The amount of coating between electrode a and core wire, and electrode b and core wire varies as the welding electrode is rotated. In the electrical sense both systems can be considered as variable condensers, and if they are used in a heterodyne bridge circuit, beat frequencies can be produced which are a measure of the variation of capacity, or variation of thickness of the dielectric. Since the coating thickness and eccentricity are related to one another, eccentricity can be measured in terms of these beat frequencies.

An advantage of this method would be its extreme accuracy; a drawback for practical uses, the fact that a number of sensitive valves would have to be used in the instrument. So far no production instrument has been designed on this basis, and only laboratory experiments have been carried out.

A method similar to the one just described, is that illustrated in fig. 8. In principle the core wire and the coating are used as resistances and capacitors in a universal bridge circuit which can be balanced with regard to magnitude and phase of voltages. A cathode ray oscillograph is used as an indicator, and the eccentricity is shown in terms of change of the image on the fluorescent screen. This method, however, has not yet been developed sufficiently to be used in a factory, a serious drawback being the employment of a sensitive cathode ray oscillograph as an indicating instrument.

The author would like to express his thanks to the Arc Mfg. Co., Ltd., for permission to publish these notes and also to Mr. Tait of The Glacier Metal Co. for providing the circuit and designing the magnetic eccentricity meter.

Modified Moly Spot Test

The Jones & Lamson Machine Co., Springfield, Vt., previously reported development of a qualitative spot test[1] for molybdenum so that molybdenum steel (containing at least 0.20 pct Mo) could be readily separated when mixed with 18-4-1 high-speed steel.

[1] THE IRON AGE, *July* 23, 1942, *p.* 37.

Now that many of the 18-4-1 high-speed steels contain from 0.05 to 1.00 pct Mo, the separation is a little more difficult. However, this problem has been met by a modification of the previously noted spot test, according to a communication from R. G. Townsend, chemists, Jones & Lamson Machine Co. The sensitivity of this modified test is such that NE and SAE 4000 steels can be separated from non-molybdenum type steels, as well as steels with high residual molybdenum content from steels to which molybdenum has been intentionally added (such as NE 8600).

Procedure to be followed in this modified spot test is as follows:

1. A small strip of filter paper is placed on the clean surface of the piece to be tested, and two drops of 1:1 nitric acid are placed on the filter paper.

2. After allowing to react for about 1 min, the filter paper is rolled onto a glass stirring rod and transferred to a clean test tube.

3. About 3 ml of 72 pct perchloric acid are then added to the test tube and contents well agitated by shaking.

4. About 5 ml of distilled water are then added and contents again shaken until filter paper is completely dissolved.

5. One drop of sodium thiocyanate[2] solution is added to tube and agitated until deep red color develops.

6. Five drops of stannous chloride solution[3] are added to tube and contents shaken for about 30 sec, then three more drops of same solution added and shaken again. This step renders the solution colorless except in the case of high molybdenum concentrations.

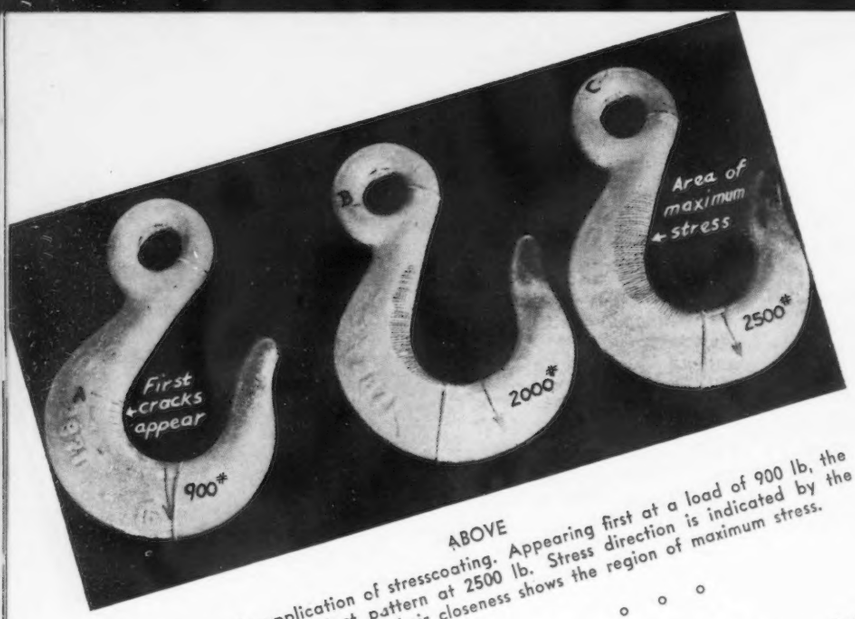
7. Five drops of the sodium thiocyanate solution are then added to the tube, the contents shaken for 30 sec, and the test is complete.

In the case of high-speed steels, 18-4-1 with no molybdenum will result in a colorless solution, molybdenum concentrations up to 1 pct result in a light orange colored solution, and molybdenum contents of 4 pct and over result in a dark red solution. In the case of NE steels and other steels of lower alloy content, those steels with a molybdenum content of over 0.05 pct molybdenum result in solutions varying in color from very light orange in the case of 0.04 or 0.05 pct molybdenum, to a deep orange color in the case of molybdenum contents of 0.30 pct or over. Steels with molybdenum contents less than 0.04 pct result in solutions which are nearly colorless.

[2] *Sodium Thiocyanate Solution*—5 *g of C.P. NaSCN dissolved in* 100 *ml distilled water.*

[3] *Stannous Chloride Solution*—32 *g of* $SnCl_2$ *dissolved in* 40 *ml conc HCl by heating until in solution. Then dilute to* 100 *ml with cold distilled water.*

There are a few precautions to observe when running this test. All solutions must be fresh. Stannous chloride loses its strength, and if the solution is over a week old, larger amounts will have to be added to kill the bright red color of the iron, and it is more difficult to estimate the molybdenum content from the resulting color. It is sometimes necessary on hardened high-speed steel, or corrosion resistant alloys, to add a drop of 1:1 HCl to the HNO_3 on the filter paper, before a reaction occurs. A small portion of the steel must be dissolved onto the filter paper, to get a test. After the solutions have been made up, molybdenum spot tests can be run in about 3 min each, or less, in the case of a large number of determinations.



ABOVE

FIG. 1—Simple application of stresscoating. Appearing first at a load of 900 lb, the cracks develop a distinct pattern at 2500 lb. Stress direction is indicated by the direction of the lines, and their closeness shows the region of maximum stress.

o o o

RIGHT

FIG. 2—Strain gages used in stress analysis of propeller blades under conditions of induced vibration are an invaluable guide in the design of these critical items.

Electric Strain Gages Aid Machine Design

As a means of revealing hidden weaknesses, or conversely of indicating areas of excessive strength with resultant overweight, the electric strain gage is proving an invaluable tool in the hands of structural and machine designers. The principle of operation and method of using these gages, as well as the indicating equipment necessary for observing the results, is described herein.

By V. E. HILLMAN
Director of Research,
Crompton & Knowles Loom Works,
Worcester

o o o

COMMONLY known as SR-4 gages, wire strain gages have been in wide use during the past few years, particularly in the aircraft industry, as a means of measuring the stresses in mechanical members. The principle of the gage goes back almost 100 yr to the discovery by Lord Kelvin that many wires change their electrical resistance when strained, but the practical application of this principle has been largely the work of Professor A. C. Ruge of MIT.

So wide has been the acceptance of strain gage measurement in the design of war materiel, that designers of all kinds of mechanical devices are turning to it for intelligent direction in problems which involve stress.

The object of stress analysis is to determine where and how great is the load or duty imposed upon a functioning part. The life of a machine member is dependent upon the nature of the stress, and the degree to which it is stressed. A part with a tensile strength of 100,000 psi will enjoy far longer life when stressed 25,000 psi than if it is stressed 60,000 psi. Hence, when abnormal stresses are found, ways and means must be developed for modifying them. Sometimes redistribution is equally effective. Such action may be taken through the medium of design, alloy steels, or heat treatment. The guiding factor is the ratio of the tensile strength of the material to the stress encountered.

The higher the ratio within limits, the longer the life of the component part. These remarks apply particularly to functioning units where rapidity of motion and reversed action are predominant. Occasionally stresses are subnormally low, resulting in heavy useless weight which may interfere with the top speed of the machine. This is particularly true where high-speed reciprocating members are involved. Sometimes a reduction in size may even reduce the operating stresses. Sometimes substitution of a light-weight alloy is suggested by stress analysis.

Computations and measurements involving stress have been attempted in the past, but calculations were based upon more or less valid assumptions and purely suppositional static tests. Accurate measurement of stresses during dynamic operation was rec-

ognized as desirable but means were not always at hand to facilitate their evaluation. Consequently, when all questionable computations were finished, it was necessary to allow a very generous factor of safety to compensate for the evils of omission in design. Even then, failure of machine parts was frequent and the failures occurred at the most unpredictable places. Through the application of the accurate measurements obtainable through the use of the strain gage, however, it has become practicable to reduce safety factors to a minimum, thereby eliminating much dead weight, and greatly increasing the efficiency of the product.

Strain gages discussed herein are manufactured and sold by the Baldwin Locomotive Works, Baldwin Southwark Division, Philadelphia.

Several devices are used to accurately evaluate stresses. First, stresscoat procedure is adopted to determine the location of the stress, after which, a wire gage is applied to the machine member at the location prescribed by the stress analyst. The cathode-ray oscillograph is then employed to measure the intensity of the rapidly varying stress, or a portable strain indicator may be substituted when steady loads are to be appraised.

Location of Stress

The location of significant stresses is important. The stress analyst should know exactly where and how to place the diminutive gages in order to get the results he wishes. Fortunately, a simple but highly effective method is available. The auxiliary device is called stresscoat, and the use of it consists principally of spraying a brittle lacquer onto the part whose stresses are to be evaluated after solvent elimination. When the machine part is stressed, dynamically or statically, cracks appear in the lacquer most densely at the areas of stress. The greater the stress concentration at a given point, the closer together these fine cracks will appear in the lacquer coating. See fig. 1. In most investigations, the location and direction of the stress should first be ascertained and it is usually well to note the areas of maximum stress concentration, those of diminishing stress, and those without consequential stress significance.

With such information, it is apparent that a long step forward has been taken toward a complete analysis. It is all very well to maintain that the danger points should be known beforehand, but the fact remains that much of the work thus far performed has provided startling revelations in the form of unsuspected sources of trouble. The usual stress raisers, such as holes, surface irregularities, sharp abrupt edges, re-entrant angles, and lack of adequate fillets are well known; but, beyond these obvious causes, the important question arises as to just where the major injurious stresses are to be found during operation of the machine. Remedial measures are predicted on such knowledge as indicated in fig. 2.

The electric strain gage is far from complex. Its operation is based on the fact that, when a piece of resistance wire is stretched, or elongated, the electrical resistance of the wire increases in proportion to the stretch. Similarly, when it is compressed, or pushed together from both ends, the resistance decreases proportionately. When a loop of this small diameter wire is firmly applied with a plastic cement to a machine part in which the stresses are to be

o o o

BELOW

FIG. 4—The highly sensitive oscillograph which operates in a manner akin to television, will register strains lasting only 1/10 of one millionth of a second.

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LEFT

FIG. 3—The simplicity of design of the standard strain gage is clearly shown in this cutaway view.

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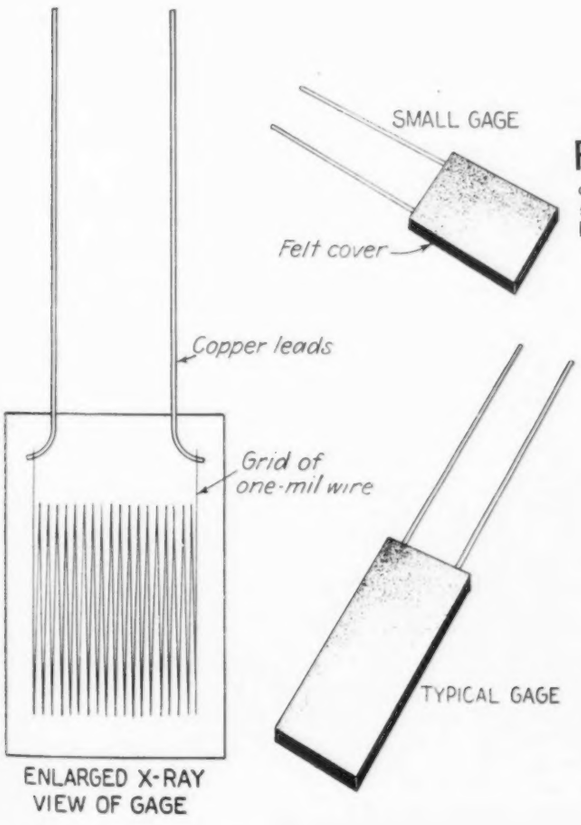


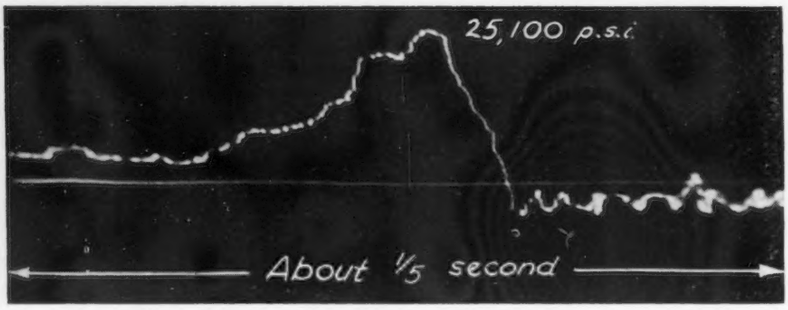


FIG. 5—An oscillogram, or photograph of a wave representing the changing electrical resistance at the gage as the member to which it is attached is stressed.

measured, it gives accurate response to the stresses encountered.

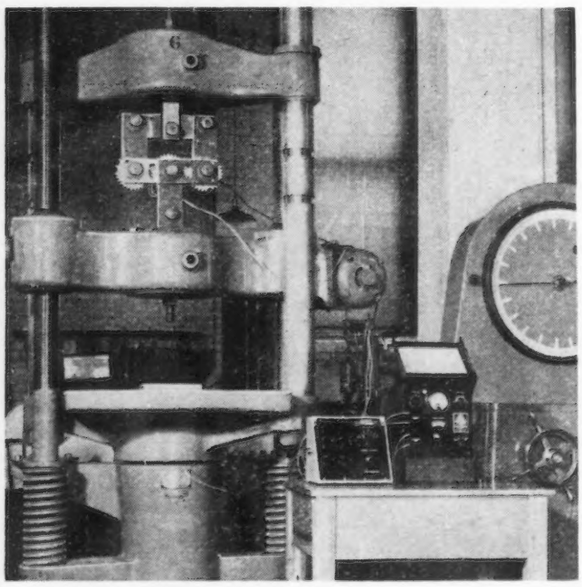
A typical gage is simply a length of resistance wire, approximately 0.001 in. diam., looped around a small piece of insulating paper. Two small copper wires are soldered to the loop ends to serve as leads. Sometimes a piece of felt is cemented over the upper side of the gage to lessen the effects of temperature and to give mechanical protection. The gages, fig. 3, are made in a variety of sizes for different applications, but usually they are less than 1 in. long and less than ½ in. wide.

Cathode-Ray Oscillograph

The cathode-ray oscillograph is an indicating device which shows, by means of a stream of electrons, any change, however small, which may occur in the value of an electric current. The speed with which these fluctuations happen in no way affects the sensitivity of this instrument. When connected into a circuit with a strain gage, a thin continuous line of light is seen moving horizontally across the viewing screen of the oscillograph. The instant that the gage is stretched the least bit, this beam of light travels upward in a peak, the height of which is proportionate to the amount of stretch at the gage, or, in other words, to the change in resistance at the gage. When compression occurs at the gage, the beam travels downward in a proportionate reverse peak. It will be noticed from the photograph of an oscillograph, fig. 4, that the panel contains many controls and reminds one somewhat of a control panel in a large aircraft. Each of these oscillograph controls tends to simplify the work of the stress analyst. The multiple knobs and buttons enable him to position the electronic beam on the screen either to the left or right and either up or down; they permit him to intensify or attenuate the beam so that it will be ideal for photography or visual examination.

Since the light waves last only a split second on the oscillograph screen, it is virtually impossible to assign accurate values to these stress peaks by mere visual observation. To do this, photographs are taken of the entire stress wave with either a still camera equipped with a very fast lens or with a motion picture camera minus the shutter. See fig. 5. Changes in the film speed mechanism are also necessary. These photographs of the light waves are called oscillograms. A pair of dividers and a scale then provide an easy method of measuring the peaks and dips of the wave. However, such measurements are meaningless unless properly calibrated. This is accomplished by introducing a known resistance (say a 1 ohm resistor) into the circuit and measuring the jump in the wave caused by the introduction of this known resistance. A simple formula is used to compute the stress value of the known calibration resistance. Then, having an actual stress value for the jump distance caused by the 1 ohm resistance, it becomes a simple matter to calculate the precise stress values of any peaks or dips caused by tension or compression at the gage.

FIG. 6—Strain gages used in determination of stress distribution in gear teeth, using a portable strain indicator shown on the table at the right.



Strain Indicator

In spite of the fact that nearly all stress analysts prefer to run dynamic tests under actual operating conditions, there are situations under which it is desirable to use some type of static test. In these cases the electric strain gage is connected directly to an instrument called a strain indicator, which gives strain readings directly in microinches per inch. See fig. 6. This instrument, which contains its own batteries, is based upon the principle of the Wheatstone bridge, with the gage acting as one of the arms of the bridge and the unbalance being expressed at the dial as strain in microinches. Two strain gages are usually employed in static testing: one, called the active gage, is attached to the part undergoing the test, while the other, called the dummy gage, is cemented to an unstressed piece of the same material as the tested part and acts as a temperature compensator. Before the load is applied, a zero reading is taken. This reading is, of course, subtracted from all subsequent strain readings. The static testing tech-

nique using the strain indicator and resistance wire electric strain gages is both speedy and extremely accurate. Even the act of touching a finger lightly to the part to which the gage is cemented is immediately registered as strain by causing an unbalance at the dial of the strain indicator.

Structural members are frequently given dynamic tests with electric strain gages. Railroad bridges, cranes, chassis components and ship construction are but a few of the hundreds of dynamic uses for these little gages. Recently one of the country's railroads contemplated the complete conversion of its steam locomotives to diesel equipment. The railroad owners were told that such a change would necessitate rebuilding all of its bridges and some sections of its track because of the added stresses that the increased speed would create. They decided to investigate the matter fully by means of stress analysis with the electric strain gages. Accordingly, gages were attached to the tracks and to structural supports of the bridges. The results revealed that the diesel locomotive, in spite of its very high speeds, actually caused lower stresses at the points in question than did the steam locomotive. This investigation saved this railroad millions of dollars and relieved it of the trouble of lengthy reconstruction.

Investigation of Maladjustments

Electric strain gages and their auxiliary equipment are unexcelled tools for getting an unbiased story of what takes place in any machine part when incorrectly adjusted for use. Since many machine failures are traceable to faulty settings of one kind or another, this particular stress activity should have popular appeal to all research workers in the machine trade, for here is a demonstrable method of laying the facts regarding proper adjustment before the user of the machine. In the presence of such evidence, the average machine operator or maintenance worker will have indelibly impressed upon his mind the importance of following the adjustments recommended by the manufacturer.

Take the example of a recent crankshaft investigation. Inspired by the complaint of a lone mill owner that the crankshafts in his machine had a remarkable short life, the manufacturer of this machinery made a careful check of all the machines of that model. When no other complaints about the durability of the crankshafts were made, the manufacturer's suspicion turned to the possibility of poor adjustment in the complainant's shop. It was soon found that rule-of-thumb settings were being followed instead of close adherence to the recommended settings of the manufacturer.

Meeting with skepticism in this revelation, the machine manufacturer turned to the resistance-wire electric strain gage for aid in proving his point. Four of the gages were attached to a crankshaft where failures had been noted and where it was known that there was some stress concentration. After connecting these gages into a circuit with an oscillograph, the machine with the crankshaft was run normally with all adjustments coinciding with the manufacturer's recommendations. The stresses were then carefully noted at each of the four gages. Then the settings were changed to agree with those used by this particular mill. With the change of setting at the center bearing, the gages indicated that the stress at one of the gages jumped up 75 pct. Other improper settings aggravated this stress increase still more.

So effective is this method of studying the stress effect of varying adjustments that some manufacturers of machinery are now equipping their products with an indicating device, having a strain gage as its basis, which flashes a red light when the machine is out of adjustment.

The author wishes to acknowledge his indebtedness to A. C. Ruge, consulting engineer, Cambridge, Mass., for his review of the manuscript.

Dismountable Electric Motor Cuts Repair Time

WHILE the modern electric motor is a highly reliable piece of equipment, nevertheless breakdowns do occur occasionally, and serious loss of production may result from the lengthy process involved in stripping this down until the fault is discovered and the damage made good.

With the object of reducing to a minimum any such loss of time, a Spanish motor manufacturer, Bomba Prat S. A. Badalona, has designed a new type of dismountable motor which is now being produced on a considerable scale in small sizes. Its design is such as to permit a ready withdrawal of any of its component parts without disturbing the others.

Should trouble develop in the stator, this can be withdrawn and another substituted without having to dismount either rotor or bearings; or if any fault occurs in the rotor or bearings, these can be removed without affecting either the stator or the frame. Bearings, incidentally, are guaranteed for 10,000 hr of operation without renewal of the lubricant.

This result has been achieved by the careful design of the main groups of essential elements which consist of (1) the shell or frame forming the main portion which is fixed to the seating and houses the other parts, (2) the fixed group consisting of the stator which is fixed to the frame in such a manner as to permit of easy removal, and (3) the rotating group comprising bearing assembly, shaft, pulley, and rotor, so arranged that by slackening off two nuts it is possible to withdraw the whole without interfering with either the stator or the frame. Electrical connections consist of suitable flexible leads projecting through a hole in the frame, but which can be readily pushed back when the stator has to be withdrawn.

In size the new design is a trifle longer than one of standard design, but the price is said to be practically identical with others of standard design built by the company.

Automatic Brazing Speeds

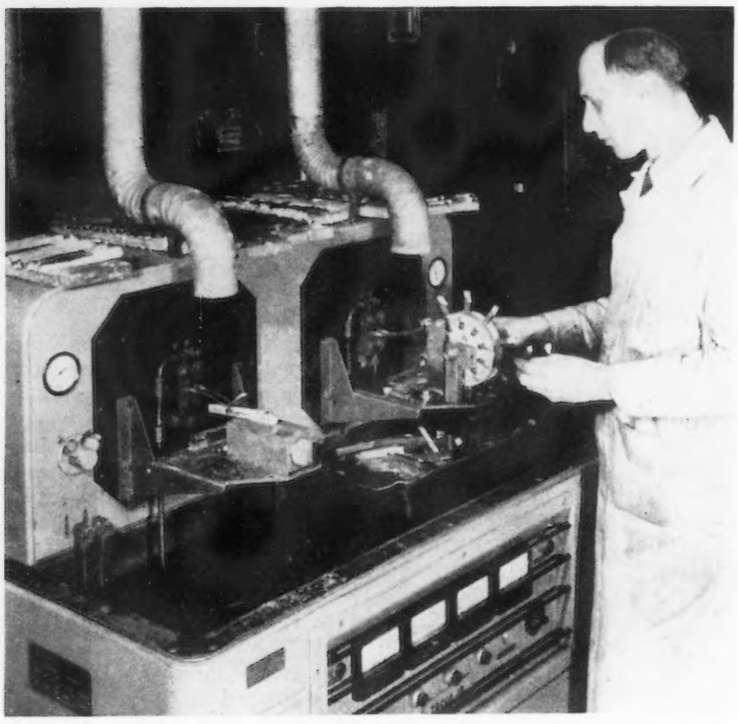


FIG. 1—View of rotary fixture showing rear support and operator about to insert tool preparatory to brazing. Tools turn in towards the machine as operator revolves the fixture by hand.

USE of induction heating for brazing tungsten carbide tips to more than 200 types of cutting tools has enabled the Willey's Carbide Tool Co., Detroit, to increase production with no increase in manpower. One of the factors bearing on the enlarged production is a rotary fixture, recently perfected, which enables one operator to do in 1 hr what formerly was achieved in approximately 8 hr.

Designed by the company, the rotary fixture is a transite block 6 in. in diameter with a 1½-in. face mounted on a revolving spindle attached to an upright support. The block has a capacity of 20 tools ranging in size from ¼ to ¾ in. square and of moderate length.

Only three bolts are needed to hold the rotary block, which can be easily removed to allow for a change in size of shank. Because the mechanism of the fixture is attached to a stationary bracket, an adaptor plate is used when changing to another size. The tools are held in the fixture by spring tension and as the operator rotates the block (he does so manually) the tool enters the field of the inductor coil where it becomes heated.

The tip is wiped in place by the operator during the heating, after which the tool passes down and out of the inductor as the very short cycle concludes. Held by mechanical tension until it arrives at the vertical, the tool is released automatically from the fixture and drops into a tote box or on to a conveyor below.

Because the flux is sufficiently adhesive, it is not necessary to hold the tip in position by any other means as the tools pass into and out of the inductor.

Following are production figures for one operator in Willey's plant, using a 15-kw Tocco machine:

¼ in. square tool bits—400 per hr
5/16 in. square tool bits—350 per hr
⅜ in. square tool bits—350 per hr
½ in. square tool bits—325 per hr
⅝ in. square tool bits—275 per hr
¾ in. square tool bits—250 per hr

Further advantages of the induction method are reported to be the opportunity to silver solder high-speed steel tips without drawing the hardness of the tip. Also, induction heat simplifies the removal of a brazed tip from a shank by quickly remelting the brazing material.

Larger tools, 1¼ in. x 1½ in. for example, are now being treated in greatly increased quantities. Two girl operators turn out 85 per hr on a 2-station unit in contrast to the 80 tools per 8-hr day by older methods. It is with these larger tools that induction's economies are seen to best advantage, and the method of operation is the utmost in simplicity. Here Willey's has used a single magnetic chuck block 6 in. long for holding the big shanks.

Achieved by the induction process for the first time is the brazing of a 2-tipped tool without the wiring required to secure the tips for treatment by other methods. The tips are held in place during the heating without extra support. The same is observed in the treating of drills, reamers and counterbores among others.

Brazing of diamond dressing tools, for straight or radius dressing, having but a single diamond, were always difficult to handle and slow to braze. Now, after the stone is positioned and the matrix base is pressed into the tool cavity around the diamond, one girl can braze 150 to 200 ½-in. tools per hr. The cycle is 3 sec heating per dresser.

Two interesting and formerly difficult brazing jobs are the brazing of tips to line reamers having a 20° spiral with inserts running the complete length of the 5-in. cutting edge, and the brazing of broach buttons ¼-in. to 1-in. in diameter. Each is now quickly and uniformly accomplished by induction heating.

Inherent characteristics of high frequency currents to concentrate on a selected area make induction heating an ideal medium for tool brazing. The heat can be restricted to the tip end which leaves the remainder of the shank cool enough so that in most cases an operator can handle the finished piece with a gloved hand. Tongs are needed only on the smaller tools.

High frequency currents when carried through an inductor will create a magnetic field within the space it encircles and will induce a flow of current in any material capable of serving as a conductor. Not only

Induction Tool Tipping

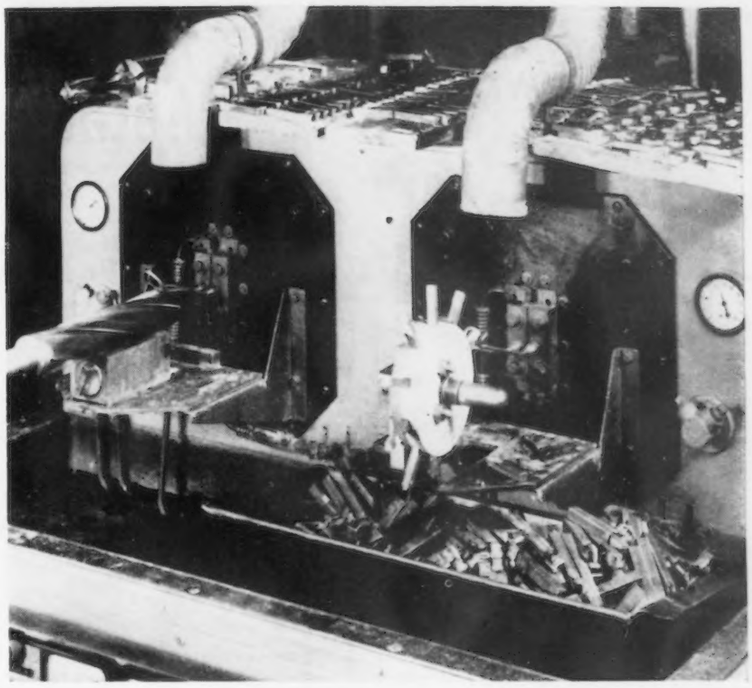


FIG. 2—Front view of the rotary fixture with tools in position for brazing. After brazing, tools drop into pan below. At left is a large drill held on a magnetic chuck. Tips are held in place by the adhesive quality of the brazing material.

does this material act as a conductor of the induced current, but it also has a resistance to this flow of energy so that it is possible to compare induction heating to straight resistance heating.

No complicated technique is required to braze properly a tip to any of the many styles of tools produced in the Willey's plant. The operator, with the tip and brazing material positioned in the recess, places the tool beneath the inductor. The heating cycle may run from 3 sec upward to 1 min, depending upon the type of tool being brazed. As the heating progresses, the operator, by use of a small rod, wipes the tip into place as the material softens. Cycles can be controlled automatically or manually.

Tools are held beneath the inductor by one of three methods, of which the rotary chuck already mentioned is one. The other two are either by a screw-clamp fixture or by a magnetic chuck block of which two sizes are used, 3 x 6 in. and 4 x 6 in. With the magnetic block big tools can be easily positioned beneath the inductor in rapid fashion where they are held firmly during the brazing cycle.

Following installation of the process in the Willey plant shipments went up 20 pct in one month with no increase in manpower and where certain jobs had costs as high as $4 per hr the use of induction brazing had reduced these same costs to as low as 30¢ per hr.

Compared to other methods used to braze tips, the following cost-cutting advantages of induction treatment are cited: (1) induction eliminates removal of excess metal from the shank of the tool, (2) it does away with wiring tip to shank, (3) it reduces wear on the finish grinding wheels by elimination of the wiring on tip, (4) it is cooler and cleaner, (5) it is a more positive, uniform type of braze, and (6) it holds rejects to a fraction of a percent.

Not without significance is the fact that it has been possible to amortize the cost of two induction machines in three months' time.

These operations are being performed on two 15-kw, 2-station, 9600-cycle units of standard Ohio Crankshaft Tocco process make, equipped with water-cooled inductor coils easily changed to accommodate different tools. With two stations each, these compact, self-contained units, 48 x 32 in. base dimensions, are located in the production area of the shop where they provide full-capacity operations.

Spot Welding Accelerates Tryouts for New Products

AN ILLUSTRATION of how mass production methods such as spot welding with automatic or semi-automatic equipment can be employed to get certain types of products on the market economically and with much greater speed than has heretofore been possible is shown by a recent venture made by a Midwest cabinet manufacturer. With the aid of assembly spot welding, the company was able to have a trial lot of 5000 all-steel utility tables, for domestic, commercial, and industrial uses, in the hands of the retailer within about five weeks' time after the project had been authorized, and without major investment in production equipment on the part of the manufacturer.

Portable gun spot welding, carried out in the job welding department of Progressive Welder Company, Detroit, was the fabricating method which permitted the production of the 5000 steel tables quickly and at a low cost per finished item.

The tables consist of four legs and three shelves each. All components are of 16 gage steel stampings. The simple sections requiring no expensive press dies are assembled with a total of 24 spot welds.

Only a single clamping type rotary work-holding fixture was necessary to complete the assembly of the tables. A production speed of 16 tables per hr with one operator was easily attained, thus permitting the entire lot of 5000 units to be placed in the hands of the retailer in five weeks.

This number of all-steel tables of one size is generally considered a high production run and normally involves considerable financial investment in dies, jigs and fixtures and other equipment with which to fabrirate the units. Use of spot welding made possible the production of the 5000 tables at a minimum overall cost and so permitted large-scale local sampling of the market for this particular item in a space of time generally held to be insufficient to make even a cursory market analysis.

Metallurgical Aspects of

By M. J. ZUNICK
Metallurgical and Chemical Engineer, Vacuum Tube Engineering Dept., General Electric X ray Corp., Chicago

Some of the unusual operations involved in X ray tube manufacture, including casting of anodes, mounting of the filament, preparation of targets, glass to metal sealing and tube exhausting are discussed herein from the metallurgist's viewpoint. Some interesting notes on preferential heating characteristics of vacuum furnaces are included.

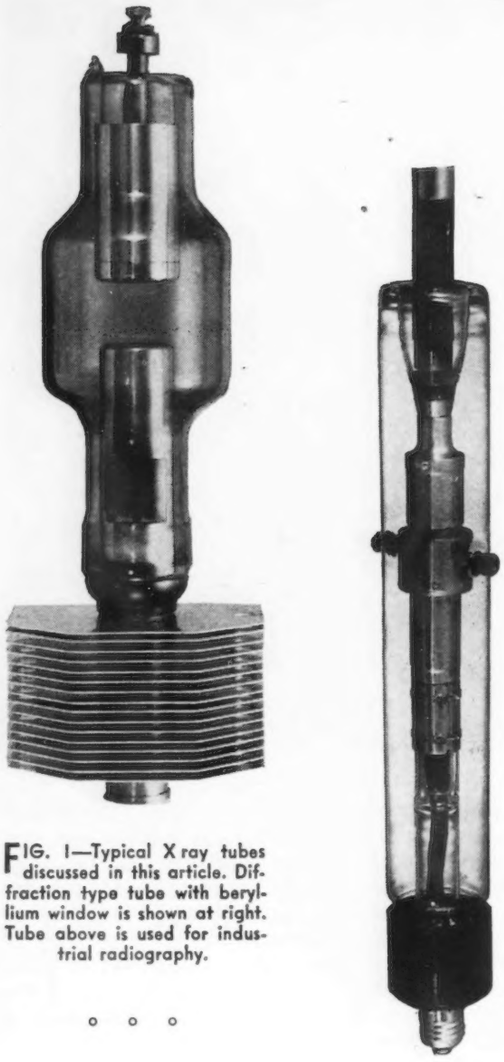


FIG. 1—Typical X ray tubes discussed in this article. Diffraction type tube with beryllium window is shown at right. Tube above is used for industrial radiography.

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THE manufacture of X ray tubes is replete with problems not commonly found in the general field of vacuum tube manufacture. X ray tubes are manufactured on a relatively small volume basis and it is only recently that mass production techniques have been considered for some phases of their manufacture. The large number of types and intricacies of manufacture definitely restrict the use of mass production methods. The life span of an X ray tube is relatively long. It is not unusual for one to be in service for 10 or more years. Uses of X ray tubes fall into two main classes, medical and industrial. Representative types of tubes used for industrial purposes are shown in fig. 1.

The common X ray tube appears to be simple in structure as indicated in fig. 2. However, the manufacture of component parts and their assembly require extremely close attention to all processes and inspection operations. Many of the processes are unique to the manufacture of X ray tubes and require special equipment not ordinarily found in a metallurgical processing plant.

The physical requirements of an X ray tube are exceptionally severe. Those requirements of interest from a metallurgical standpoint are; (1) density and melting point of targets and anode castings which have a direct bearing on loading and heat transfer, (2) purity of metals with respect to both metal impurities and absence of gases; (3) cleanliness of all surfaces and avoidance of low melting metal impurities, and (4) chemical composition especially in the case of low expansion metal sleeves.

With the advent of forged tungsten,[1] the hot cathode X ray tube came into prominence. Since that time tungsten has been universally used as a target material whenever total white radiation is desired. The advantages of tungsten for use as a target material in tubes are its melting point, 6090°F, its high density and atomic number, advantageous from the standpoint of intensity of X rays produced, its relatively high heat conductivity, and its extremely low vapor pressure at high temperatures.

Copper is used for the anode body for its practically ideal heat conductivity and its relatively low price and availability. It does not alloy with tungsten, but wets it, forming a firm bond. Its melting point, although far from ideal when regarded in view of heat loading, is especially advantageous with respect to casting operations. The vapor pressure is sufficiently low at high temperatures not to interfere with normal operation of the tube. Copper has no counterpart for use in X ray anodes. Silver which might be used has the one objection of relatively high cost. Other minor objections such as lower melting point also exist but these would not preclude its successful use.

The target in a stationary anode tube must withstand loadings on the order of 200 milliamperes at 80 kv distributed over an area approximating 0.155 sq cm. The exposure times are short, being on the order of 0.1 sec. Thus the momentary intensity of heat

X Ray Tube Manufacture . . .

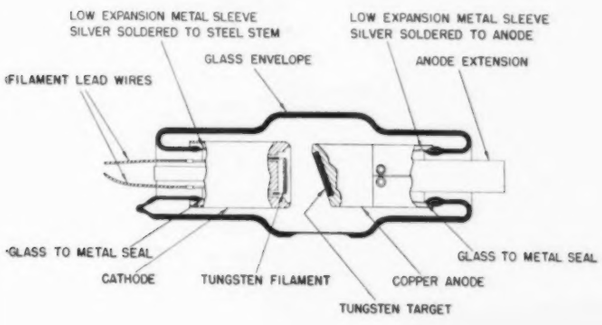
loading is 103,000 w per cm². Heat input is generally calculated without considering the approximately 1 pct of energy consumed in production of X rays. Practically all of the heat must be dissipated by conduction through the copper anode, for little is dissipated by emission either from the target[2] or the copper anode. The temperature of the tungsten target during the loading period cannot be determined by pyrometric methods for obvious reasons. However, such temperatures have been calculated to be as high or higher than 4710°F at the surface.[2]

The steel cathode of an X ray tube, aside from maintaining scrupulous cleanliness, offers little difficulty of a metallurgical nature. The rather intricate slot in the face of the cathode, in which the tungsten filament is mounted, must be machined to an accuracy of 0.001 in. The filament, before positioning in the slot, must be heat treated to remove all strains, yet must have sufficient strength to permit handling and assembling by hand. The filament must be positioned with respect to the sides and bottom of the slot to within 0.001 in. and this position must be maintained throughout the life of the tube, otherwise the critical focal spot size will be affected.

Glass used as envelopes in X ray tubes is of the borosilicate (hard) type, chosen to meet specific requirements of individual tubes. One important requirement of the glass is that it contain no appreciable quantities of elements above calcium in the atomic chart, for even a fraction of 1 pct of such elements will filter out substantial quantities of X ray. Since the subject of glass in electronic tubes is of a special nature, it will not be discussed in detail in this article. A comprehensive discussion of this subject was recently published by H. C. Steiner.[3]

The sleeves to which the glass envelope is sealed must be made of a metal that has a coefficient of expansion approximating that of the glass. Very few metals meet this requirement in a broad sense, actually only two commercial compositions, 42 pct nickel steel and a high nickel-cobalt ferrous alloy, are generally used. Copper sleeves can be used but have the objections of low strength and of being too easily oxidized.

The recent expansion in the uses of X ray diffraction tubes and other requirements have necessitated the developmnt of a material that is pervious to long wave X rays. The recent development of the beryllium window diffraction tube has met all the requirements for efficiently generating and transmitting long wave rays. The metallurgy of beryllium has been an interesting subject for many years and although a truly malleable beryllium has not yet been developed, the present art has been developed to a point where no



ABOVE

FIG. 2—Diagrammatic section of a diagnostic X ray tube. Many of the processes employed in manufacturing such tubes require equipment not ordinarily found in a metallurgical processing plant.

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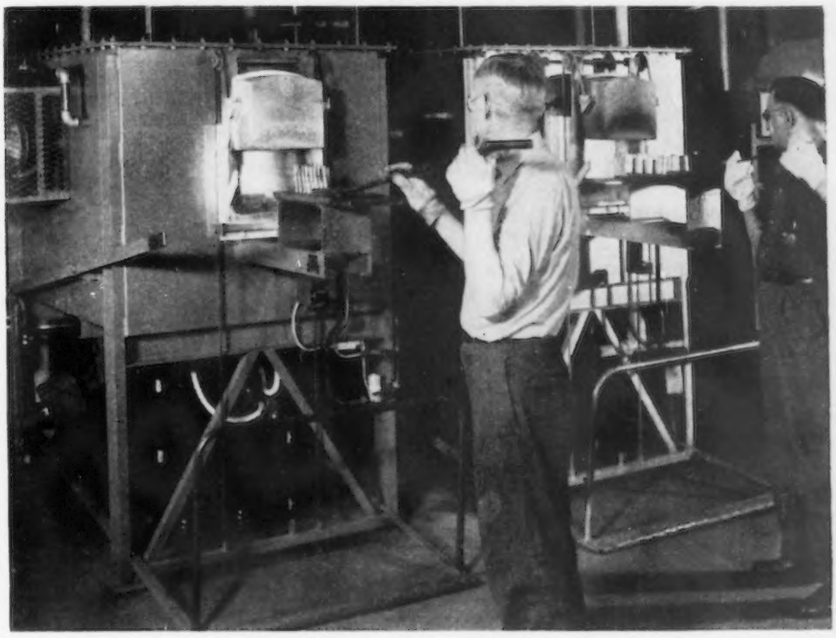
RIGHT

FIG. 3—Electrically heated pure hydrogen atmosphere furnace used for heating, stress relieving and other processing in X ray tube manufacture.



particular difficulty is experienced in producing vacuum tight disks as required for X ray tubes.[5, 6, 7, 8]

The preparation of the X ray tube anode requires more metallurgical thought and processing technique than all the remaining parts of the tube combined. This is the result of the strict requirements placed on the purity and density of the target materials as well as the soundness of the anode castings.

In all cases, except in most X ray diffraction tubes, the target consists of rolled and forged, or both, sintered tungsten bar. The tungsten sheet is speciallly prepared by the metal manufacturer to meet the strict requirements of the X ray tube industry. Tungsten for X ray tube targets must be dense and free from cracks and laminations. The targets are prepared from the tungsten sheet by cutting with abrasive wheels and, in the case of round targets, by punching the sheet at relatively high temperatures. Heating for punching operations and for strain relief is done in an electrically heated pure hydrogen atmosphere furnace similar to the one shown in fig. 3.

Most diffraction tube targets consist of a number of metals other than tungsten, for example molybdenum, iron, cobalt and nickel. In all cases the targets must be made from highly purified powders, for under certain conditions as little as 0.01 pct of a metalilc impurity may interfere with the results obtained in X ray diffraction work.[7, 9] Chromium target diffraction tubes are used frequently and are made by electroplating the surface of the copper anode with chromium to a specified thickness. In many cases copper radiation is needed and this type of tube requires no target material, for the anode itself serves as the target, providing it is sufficiently pure.

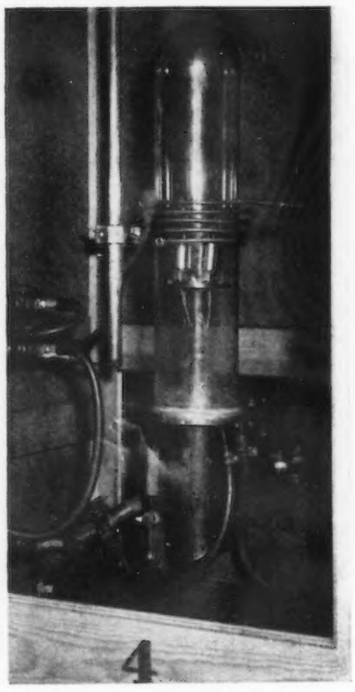


FIG. 4—Vacuum furnaces with high frequency induction heater which provide preferential heating find wide use in X ray tube production for such operations as casting anodes, degassing, soldering.

Anodes are cast in vacuum furnaces of which two types are generally used. The Arsem type, although cumbersome, permits casting anodes in relatively large quantities at one time. It consists of a large steel shell, surrounded by water for cooling and heated with internal graphite resistance elements. The other type consists of a water cooled vacuum bell jar system with melting accomplished by a high frequency induction generator.[10] A typical example of the latter type furnace is shown in fig. 4. Vacuums on the order of 0.01 mm to 0.20 mm must be maintained to obtain nonporous, gas free castings.

Deoxidized types of copper must be used for castings, otherwise porous, gaseous castings will result. Calcium boride deoxidized and OFHC copper may be used with equally good success. In general, wrought copper in round rods is used in diameters to closely approximate the size of the crucible-mold, for space is at a premium in a vacuum furnace. The crucible-molds and component parts are machined from solid graphite to a tolerance of from 0.0005 in. to 0.002 in. They are loaded for the casting operation as shown in fig. 5. The crucibles are reused a great many times since the castings are readily removed without damaging the crucible.

Diffraction tube targets such as iron, nickel and cobalt, which tend to alloy with molten copper, are silver soldered into the copper anode using various commercial silver solders.

All castings are radiographed prior to machining to determine their soundness. The assembly shown in fig. 5 is simple compared with many which are cast with graphite insert to form a cup-like structure. This latter type, unless all processing is carefully controlled, is difficult to produce to the required specifications.

All anodes are machined to close tolerances for in practically all cases a low expansion metal sleeve must be silver soldered to the anode as indicated in fig. 2. The tungsten targets in all cases are wet ground to a fine finish and in the case of the large rotating anode, the tungsten is subsequently electrolytically polished to a mirror finish.

The rotating anode type of tube has an anode supported internally on two sets of ball bearings mounted on a stationary stem. The anode itself acts as rotor and is actuated by a stator mounted outside of the glass envelope of the tube. During operation the bearings must operate at temperatures as high as 1110°F with the anode rotating at about 3000 rpm. The balls and races are made of high speed tool steel hardened to 63 to 65 Rc and are lubricated with a thin metallic film after the tube is completely evacuated and sealed off. The lubricating film consists of barium evaporated onto the balls and races from an electrically heated barium cored iron wire.[11]

The cathode in an X ray tube consists of a hot tungsten filament located within a slotted open cup made of any good grade of cold-rolled steel. It is supported either on a glass pinch seal by means of clamps or on a steel stem which in turn is copper brazed to a low expansion metal sleeve. The metal sleeve also serves as a means for introducing electrical leads insulated by glass eyelets. The filament is originally wound on a molybdenum mandrel and permanently set by heat treating in a hydrogen furnace. Close tolerance must be met as the filaments must be permanently mounted in the slot of the cathode cup to a tolerance of 0.001 in. with respect to the edges and bottom of the slot.

Hydrogen furnaces similar to the one shown in fig. 3 are indispensable for treating tube parts. Heat treating and brazing tungsten and molybdenum parts can be successfully accomplished only in a reducing atmosphere. Parts which may have become oxidized during processing are readily cleaned by heating in the reducing atmosphere of the hydrogen furnace. Parts which have been fired in a hydrogen furnace are more easily degassed in the final tube during exhaust operations.

The bell jar vacuum furnace as shown in fig. 4 is used chiefly for preliminary degassing parts and assemblies before sealing into the tube. This type of furnace permits preferential heating of certain portions of the assemblies. The filament and support in

the assemblies shown inside the furnace are made of tungsten and molybdenum respectively and they can be heated to as high as 2900°F, while the glass portions of the assemblies remain at temperatures well below the sagging point of hard glass (1110°F). The bell jar vacuum furnace is also used for silver soldering assemblies where fluxes, required if soldered in air, are objectionable with respect to difficulty in removing residual flux from inaccessible recesses.

Choice of furnaces for preliminary firing (degassing) operations rests upon many factors. In cases where parts are not subjected to excessive temperatures within the tube, they are generally fired only in the hydrogen furnace because of lower processing costs. The two types of furnaces are not restricted to firing cathode parts and assemblies. The hydrogen furnace is used for other operations such as plating tungsten buttons, prior to casting operations, with pure copper by reduction of a layer of cuprous oxide. It is also used for copper brazing steel parts and prefiring of metal sleeves prior to application of wetting glass. The bell jar vacuum furnace is also used to silver solder and degas certain special types of anodes. The X ray tube industry was one of the pioneers of the hydrogen furnace and the high frequency induction vacuum furnace for industrial use.

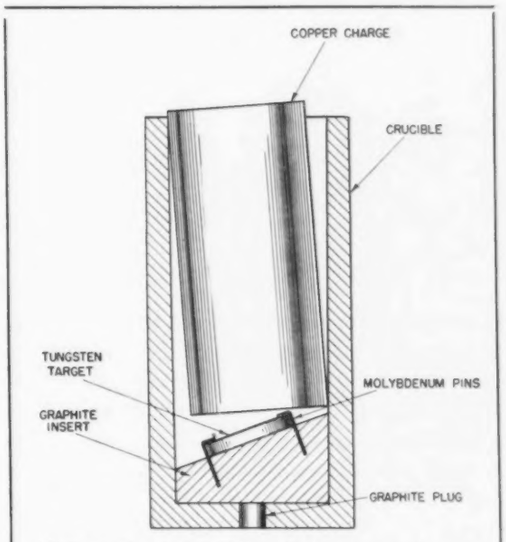


FIG. 5—Crucible-mold loaded for the anode casting operation.

The hard glass envelope of an X ray tube in most cases is sealed to a low expansion alloy sleeve which, in turn, is soldered, brazed or welded to metallic components of the anode or cathode. The sleeves are formed from sheet on a standard punch press. Two types of low expansion alloys are normally used for the sleeves, the cobalt-nickel-iron alloy represented by commercial products such as Fernico and Kovar and the nickel-iron alloy represented by Nickelex. The composition of the former alloy is approximately 54 pct Fe, 30 pct Ni, and 16 pct Co, while the latter alloy contains approximately 42 pct Ni, remainder Fe plus small percentages Mn and C.

After forming and machining, the sleeves are heated in the hydrogen furnace for a short period to remove strains and to prepare the surface for application of the wetting glass. The hydrogen furnace treatment decarburizes the surface as well as cleans it. The sleeves are then ready to be oxidized in an open flame and wetting glass is applied before cooling. The oxide film is necessary for the formation of a vacuum tight bond between the glass and the metal sleeve. The oxide film actually goes into solution with the glass thus forming a chemical bond.

The sleeves with the wetting glass applied are then silver soldered to the copper anode, generally with eutectic silver-copper alloy of 72 pct Ag, 28 pct Cu, either in air or a vacuum furnace. Whenever the sleeve is used at the cathode end of the tube it is generally copper brazed to a steel header prior to application of the wetting glass. After sleeves have been soldered or brazed to the cathode or anode assemblies, a glass envelope is sealed to the wetting glass of the two sleeves on a glass working lathe.

The completed tube is exhausted by sealing to the pumping system through a glass constriction. The pumping system is a special mercury diffusion pump backed by a mechanical pump of standard make. Oil diffusion pumps are also used. However, mercury pumps have been shown to be more rugged and foolproof. After preliminary exhausting, the tube is baked out at 840°F in a gas furnace. This operation is necessary to expel gases absorbed on the inner wall of the glass envelope. The anode and cathode are then individually degassed by heating to a dull red heat by means of a high frequency induction coil. Finally the anode is bombarded, that is, the tube is actually operated at this point until free of gas. During all of these operations the tube is being continually outgassed by the pumping system and pressures are closely watched by means of an ionization gage attached to the exhaust system. The ionization gage is connected directly to a microammeter which indicates pressure in microns. The tube is considered exhausted only when pressures are on the order of 0.1 m. The tube is finally sealed off by collapsing the constriction under heat.

References

[1] Research Laboratory, General Electric Co., "X-ray Studies," (1919).

[2] "Transient Temperatures in the Anode of an X-ray Tube," F. R. Abbott, J. App. Phys. 13, 384 (1942).

[3] "Glass in Electronic Tubes," H. C. Steiner, Bull. Amer. Ceram. Soc. 24, 56 (1945).

[4] "Glass-To-Metal Seales, II," A. W. Hull, E. E. Burger and L. Navias, J. App. Phys. 12, 698 (1941).

[5] "Beryllium Windows for Permanently Evacuated X-ray Tubes," H. Brackney and Z. J. Atlee, Rev. Sci. Inst. 14, 59 (1943).

[6] "Beryllium Windows," Z. J. Atlee, G. E. Review 46, 233 (1943).

[7] "Diffraction of X-rays," Z. J. Atlee, Radio-Electronic Engr., June 1944.

[8] "Sintered Beryllium for X-ray Tube Windows," F. C. Kelley, THE IRON AGE, July 26, 1945.

[9] "Industrial X-ray Tubes," Z. J. Atlee, Electronics, November 1945.

[10] "Vacuum Casting of Electronic Parts," K. Rose, Metals and Alloys, 21, 1324 (1945).

[11] "Lubrication in Vacuum by Vaporized Thin Metallic Films," Z. J. Atlee, J. T. Wilson and J. C. Filmer, J. App. Phys. II, 611 (1940).

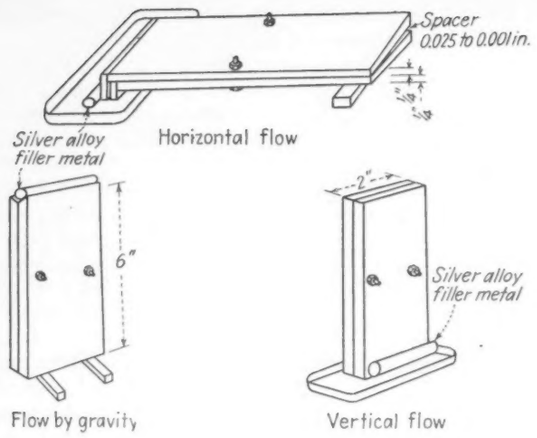


FIG. 1—Assemblies used for determining distance of filler metal flow in relation to joint spacing.

Filler Metal Flow In Brazed Steel Joints

An investigation to determine distance silver alloy filler metal will flow in steel brazing operations in relation to joint spacing, type of parent metal and direction of flow is discussed herein. Parent metals used in the tests were SAE 1020, NE 8630 and stainless type 302. The investigation was made by the production development laboratory, North American Aviation, Inc., Inglewood, Calif.

RECENT investigations at this plant have indicated that both SAE 1020 and NE 8630 steel can be satisfactorily brazed with silver alloy filler metal, using joint spacing of 0.001 to 0.004 in. The tests also covered stainless type 18-8-302, but the results indicated that this stainless should not be used with Fluxine No. 43. It is expected that further investigations will be undertaken to determine a flux which will improve the silver alloy wetting action on stainless steels.

The primary purpose of the investigation reported here was to determine the distance silver alloy filler metal will flow in brazing operations in relation to joint spacing, type of parent metal and direction of flow. In conducting the tests, two assemblies each of the designs shown in fig. 1, were made for three types of steel, SAE 1020, NE 8630 and 18-8-302. Parts were roughly machined to size and normalized to prevent excessive warpage during brazing. They were then accurately surface ground to size with a surface roughness between 40 to 100 m in. inside joints. All parts were thoroughly degreased by trichloroethylene before assembly.

Fluxine No. 43 was brushed inside joints along center and toward spaced side. Care was taken to keep flux from inside plates near side opposite spacer so that plates would assemble close together on this side. Parts were then assembled and flux brushed completely around joint. This procedure insured that plenty of flux would penetrate over all areas within the joint.

A 100 pct excess of silver alloy filler metal was then placed at positions shown in the drawing. Small lids were used to hold filler metal for the vertical and horizontal flow tests. Easy-Flo brazing alloy, made by Handy & Harman, was used. The melting point of this alloy is 1160°F and flow point 1175°F.

One assembly of each spacing type and steel type was brazed in a Drycolene atmospheric furnace at 1400°F for 10 min and another set at 15 min. The purpose of the test was to hold the samples at this temperature a short enough time so that the joints would not be completely bonded. By running two sets at different heating periods comparison could be determined in the set showing the best penetration.

Flux on outside surfaces was removed by washing in hot (200°F) 10 pct caustic soda followed by a hot water rinse. Excess filler metal was ground from

TABLE I

Joint Fill on Various Parent Metals at Representative Spacings

After brazing at 1400°F for 15 min with an excess of filler metal

Direction of Flow	Joint Spacing In.	Depth of Fill—Inches		
		SAE 1020	NE 8630	18-8-302
Gravity	0.024	1.00	0.90	2.45
Gravity	0.010	2.85	2.40	2.80
Gravity	0.004	6.00	6.00	3.60
Vertical	0.024	0.65	0.80	0.00
Vertical	0.010	2.00	2.40	0.00
Vertical	0.004	6.00	6.00	0.00
Horizontal	0.024	0.00	0.00	0.00
Horizontal	0.010	6.00+	6.00+	0.00
Horizontal	0.004	6.00+	6.00+	0.00

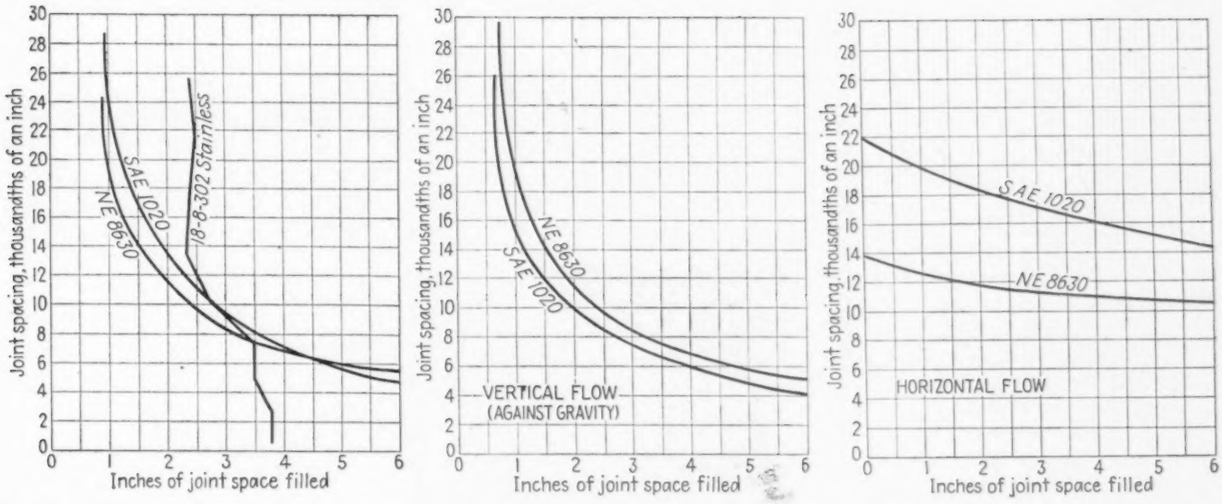


FIG. 2—Silver alloy flow in test assemblies. Graph on left covers flow aided by gravity, center graph covers flow in vertical position (against gravity) while chart on right covers horizontal position. Stainless fill was found only in gravity flow specimen.

edges followed by a light shot blasting to thoroughly clean the surfaces.

An X ray was taken to show the filler metal penetration into each joint. Prints were made of each X ray so that distance of penetration could be measured. However, the contrast in these radiographs was not sufficient to permit effective reproduction here.

Sections were cut the long way of the assemblies for each ½ in. across the 2 in. width. Joint sections were polished, nital etched and the spacing measured for each ½ in. along the 6 in. length of each section. Spacing increases over the ½ in. distances in the direction across the 2 in. width were averaged to determine spacing at ¼ in. intervals. The spacing records for each ¼ in. section were averaged and the depth of filler metal penetration corresponding to the position of each section measured on the Xray prints. The results are given in a condensed form in table I. The graphs, fig. 2, give silver alloy flow in vertical, horizontal positions and when aided by gravity. No flow in joint of stainless steel occurred in either the vertical or horizontal positions.

The graphs in fig. 2 covering flow in a vertical direction (against gravity) (center) and flow aided by gravity (left) indicate that, within experimental errors, the flow in relation to spacing is about the same for the SAE 1020 and NE 8630 steels. The filler metal flows into a definite pattern which is controlled by the capillary attraction and only slightly affected by gravity. Where gravity assisted the flow, the space filled is slightly larger for a given time at temperature.

When stainless steel of the 302 type is considered, a different flow pattern is obtained, as shown in the graph, left, fig. 2. Radiographs covering flow in the vertical and horizontal positions show no evidence of capillary attraction with this steel. If a flux could be developed which would increase the wetting properties of the stainless steel, then some capillary attraction would be developed.

No attempt was made in this investigation to show a comparison between distance of filler metal flow and the time samples were in the heating chamber. The trays used were heavily loaded with jigs to hold the samples in position. This increased the heating up period. If the samples had remained in the heating chamber for a longer period, the joints would have been more completely filled.

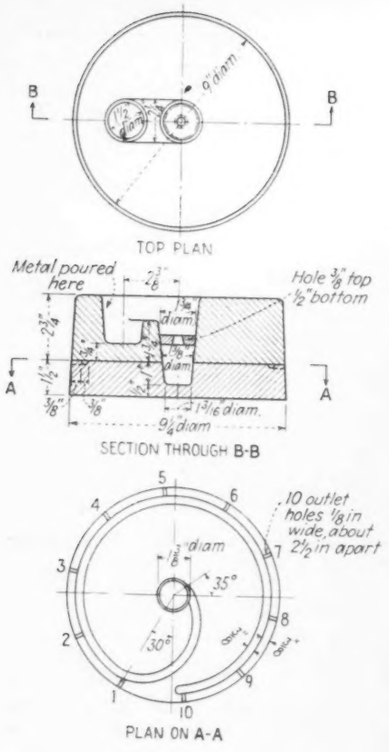
Cleaning Machine Removes Welding Scale

IN using one of the processes developed in wartime manufacturing, a leading automotive manufacturer found that it was possible to substitute a stamped and welded tube for the conventional cast and machined rear axle housing, with substantial savings in materials and machining costs. In practice, however, it was found that when the two formed halves of the housing were seam welded together, a loose scale formed on the interior near the welds. It was feared that this scale would eventually flake off and mix with the differential gear lubricant to form an abrasive that would harm the gears.

Engineers of the Howard Engineering & Mfg. Co., Cincinnati, found that even high pressure sprays would not remove this scale, and turned to a mechanical method of removal. A special machine was developed that conveyed the axle housing on a belt up to a stop where a revolving steel brush entered the housing to brush loose the scale. At the same time a cleaning solution was fed through and around the brush as well as on the exterior of the housing, flushing away the scale and other foreign matter. At the completion of this operation, the conveyor moved the work to a second station where the housing was dried with hot air.

The conveyor belt of the machine incorporates fixtures that hold each axle housing in the correct position during both the brushing and drying operations. Operation of the brush into and out of the housing is accomplished by an air cylinder operated in conjunction with the indexing of the belt.

Rapid Test for Fluidity



ABOVE

FIG. 1—Details of fluidity test mold formed of two oil sand cores. The lower half contains the modified spiral form.

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BELOW

FIG. 3—Iron poured from half-empty ladle shows the reduced fluidity with the metal escaping from only two holes in the test mold.

ABOVE

FIG. 2—First iron poured in test mold shows metal escaping through four holes.

o o o

THE necessity of obtaining an approximate measurement of the fluidity of iron in order to determine its suitability for a given section is obvious to any practical foundryman. A detailed study of defective casting records will bear ample testimony to the fact that many castings are lost simply because the iron poured into the mold was not in a condition suitable for running thin sections.

It is not unusual to find on investigation that the metal was melted hot, wedge control appeared satisfactory and the metal appeared to be hot enough in the ladle and that in consequence those responsible felt justified in proceeding with the cast, an explanation which, though it sounds plausible, gives but little satisfaction.

No one would wish to deny that metal temperature, composition and wedge control are functions affecting fluidity but the fact remains that these are not the complete answers and the desirability of instituting a quick and practical test which may be carried out on the job immediately prior to casting is clearly indicated. The fluidity test is in effect a measure of the efficiency under which melting practice is carried out. If properly used it may bring to light many of the shortcomings relating to cupola operations not rapidly discernible by any other means.

The standard spiral fluidity test has been in use in this foundry for a number of years but we have never been entirely satisfied with it. Results have been inconsistent, and there is, of course, a time lag between casting the test piece and determining the length of the spiral. This time lag is a factor which must be reckoned with when a considerable number of hand shanks are being fed from the same holding ladle, since it is possible that between the time of casting the test pieces and determining the length of the spiral, many shanks may have been filled with metal and the iron poured into molds.

The fluidity test described in this article is a development of the standard test but is designed to simplify the making of the test mold and to eliminate the undesirable time lag in obtaining a reading.

Measurement . . .

By G. B. TAYLOR
Ashmore, Benson, Pease & Co., Ltd., Stockton-on-Tees, England

The test described herein, a modification of the standard fluidity test, is designed to simplify making of the spiral mold and to eliminate undesirable time lag in obtaining a reading.

Reference to fig. 1 will show that the test piece is formed by two oil sand cores. The lower half contains the modified form of spiral and the upper half the runner basin and strainer cores. Note that the metal is not poured directly on top of the strainer core but into a well at the side, thus allowing greater ease for the pouring basin to be kept full. The strainer core is set well below the top of the outlet from the pouring basin to allow for a reasonably constant ferrostatic head above the strainer. The two halves of the core are held together by weights or by means of a simple clamp.

As indicated in fig. 1, the metal passes from the well beneath the strainer core to runner bar concentric with the outside wall of the core and at regular intervals branches are made to radiate from the ring to the outside of the core. These branches provide the means of determining, without stripping the core, how far the metal has run in the concentric ring, since it will obviously flow out of each hole in turn as it travels round the ring.

LEFT

FIG. 4—As the bottom of the ladle is reached, the fluidity has become so reduced that metal will flow through only one hole.

RIGHT

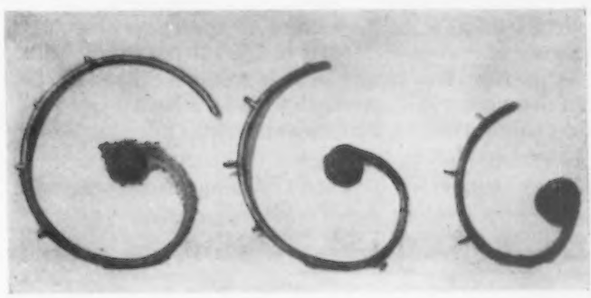
FIG. 5—Typical test spirals of Meehanite iron of varying composition; left, Meehanite GE; center, type GC, and on the right, type GM.

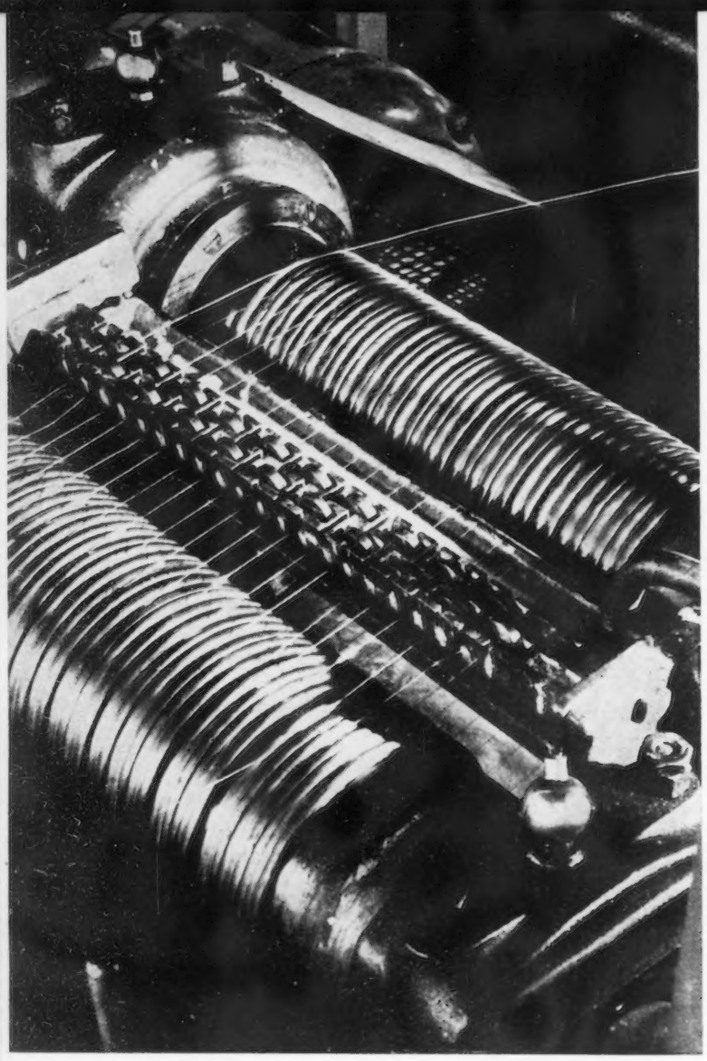
It only remains to decide out of how many holes the metal must flow in order to be suitable for a given metal section, that is, it may be that to run a section 3/16 in. thick requires that metal flow out of four holes. With this knowledge tests are taken frequently during casting and immediately the number of holes through which the metal flows falls below four, casting is stopped and the metal returned or put into thicker section work.

Fig. 2 shows the first iron being poured from the holding ladle into the fluidity test mold. Note the metal escaping through four outlet holes. Fig. 3 shows iron being poured with the holding ladle half empty. Note that in this case metal was flowing through only two holes. Fig. 4 represents the last of the metal from the holding ladle and the fluidity of the iron has become so reduced that metal will flow through only one outlet hole. Fig. 5 shows typical spirals obtained from various Meehanite irons, left, Meehanite process GE, center GC Meehanite, right GM Meehanite.

This type of fluidity test is recommended, for since adopting this apparatus to assure regular control test some four months ago, a considerable reduction in the number of misrun castings has been achieved.

This paper was originally presented at the 1946 annual meeting of the Meehanite Metal Corp. Tests described herein are covered by British Patent application No. 15,816 and U. S. Patent No. 2,395,254.





Fine Wire Drawing

War demands for fine steel wire forced sharp increases in the output of this item and brought to American wire makers a new batch of technological headaches. This article discusses those drawing problems and explains the technique now used in this country for successful production of fine wire on a large scale. Potential postwar markets for this item, which heretofore has been considered primarily an imported product, are also covered.

o o o

By S. C. AVALLONE
Spencer Wire Co.,
West Brookfield, Mass.

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PRIOR to the war substantial quantities of quality precision fine wire were imported from Europe. Few American wire companies were equipped to produce economically fine steel and alloy wires in the quantities and quality required. With the outbreak of the war American ingenuity and resourcefulness was, of necessity, put to work to produce in large quantities wires which previously had been imported.

This was not a simple task and meant an intensive study of the preparation of special alloys, of heat treatment and workability of these materials and the construction of drawing equipment specially designed to manufacture these materials in the quantities demanded by the war effort. This article covers some of the operations which have in the past been persistent sources of trouble in the production of fine wire.

The cleaning of precision wire for fine drawing presents a problem because of the small sizes involved. The effects of faulty cleaning are particularly pronounced in view of the nature of the operation—wet drawing at speeds of 1800 ft to 2500 ft per min. Thus peak performance in the drawing operation cannot be attained unless the wire is thoroughly cleaned and free of all foreign matter such as smut, lime, drawing lubricant and oxides.

There is inherent danger in both under-cleaning and over-cleaning. Under-cleaning is the incomplete removal of material which would interfere with subsequent drawing, while over-cleaning results from excessive acid attack producing an open and rough wire surface. Either condition will cause abnormal die wear which means high die replacement and consequently low production.

To safeguard against under-cleaning some mills have resorted to what is called a double cleaning or rust-bluing operation, in which the material is first cleaned, then allowed to rust and then recleaned. However, this is a costly procedure and should not be specified unless absolutely necessary.

Recommendations for a cleaning sequence based on experience at this plant are (1) Immersion in 18 pct cold hydrochloric acid, rinse; (2) immersion in hot 6 pct to 8 pct sulfuric acid, rinse, and (3) immersion in 25 pct cold sulfuric acid, without inhibitor, rinse.

A new development designed to eliminate cleaning, coating, and extra handling has been the bright annealing of the process wire in a protective atmosphere. In the case of certain grades of coated wire, liquor coating is placed on the rod and drawn down to final annealing size, annealed under gas, removed from pots, and taken directly to the wet drawing room. This procedure has not only proved successful but very economical and in recent years has had extensive application.

Various coatings are used as a lubricant for fine

Additional data on fine wire drawing are given in "Fine Wire from Buffalo," The Iron Age, Nov. 30, 1939, p. 36.

drawing, as lime, liquor coating (copper-tin), or copper. For best results in drawing the coatings should be adherent, fine grain and uniform. Where a lime coating is desired hot, light lime should be used and the coating thickness developed by several dips, allowing for partial drying before each dip in lime. The fine grained character of the liquor coating is controlled by time, temperature and concentration of the relative proportions of copper and tin.

Another development in the coating operation is the coating of wire at the cleaning crane and immersion in a hot alkaline protective coating to prevent discoloration and rust. Wire coated in this manner is sent to the fine wire drawing room and drawn from a dry reel. This arrangement has the advantage of uniformity of coating and the elimination of wet tubs.

As a result of the accent on drawing speeds, studies of time losses in the operation of the drawing machine have revealed that 30 pct of the down-time is due to improper pay-off of wire because of snarls and breaks on the reel. A great deal of the trouble can be minimized by drawing the process wire in 24 in. or 27 in. ID coils, thus reducing the speed of the pay-off reel and allowing more time for strand orientation. Where possible, the ideal arrangement would be to pay off wire from spools.

Economical mill practice in fine wire drawing emphasizes machine design which will carry a heavier load faster. This means that the setting, weight and construction of the machine should be so engineered as to minimize vibration. This also means that the die stands should have accurately machined die pockets. Vibration, of course, reduces the wear and efficiency of working parts.

In the design of the drawing mechanism it is an established fact that slippage in the successive steps of drawing is one of the major causes for breakage in the machine. The uneven tension on wires because of slippage places varying loads on the dies with the result that the requirement for each draft as set up is changed beyond the ability of the machine to handle such alterations. The result is breakage.

To eliminate this factor the steps of the drawing cone should be designed to receive the lineal increase in wire as a result of successive drawing. This arrangement insures a smooth and efficient drawing operation. It has been found that 14 pct reduction in area per draft on all dies except the finish die (10 pct reduction of area on the finish) is satisfactory on ferrous materials.

It can be said that the wire drawing die is the heart of the drawing operation. It is imperative that the design, with respect to approach, bearing length and polish be suitable for the type of wire being drawn. From our experiences at the Spencer plant, the following general statements can be made. For drawing low carbon and soft coated (zinc and tin) wires short bearings should be used. In drawing high carbon wire, alloys or materials whose analyses possess rapid work-hardening properties, long bearing dies are indicated.

In recent years studies on wet drawing lubricants have demonstrated that metallic soaps such as calcium and aluminum stearated have specific application in high speed drawing.

Lubricants used in high speed machines should have a high E.P. value and stability. It has been observed that a lubricant of improper concentration or high instability at moderate temperature (90°F to 100°F) can cause considerable trouble in the drawing machine. Lean lubricant means excess die pull and cutting out of dies. Rich lubricant produces a shoved-up (drawing small) condition. It is evident that the determination and control with respect to concentration and temperature of a lubricant are of utmost importance in efficient drawing.

A substantial percentage of fine steel wire is being required on spools. For economical and efficient working the take-up should be sufficiently flexible to permit the production of coiled or spooled wire. This arrangement, if properly designed, eliminates the necessity for re-spooling, a costly procedure on fine sizes.

Technological advances in producing fine wire in this country have tremendously expanded the fine wire market. The fields which have been particularly affected are electrical, electronics, rubber and brushes.

The production of household electrical appliances during the war was reduced to nil. The postwar demands for these products will be unprecedented. This indicates that the marketing of various types of fine resistance wires will reach new peaks. Moreover, there will be an increasing demand for a variety of new low-cost alloy wires, which, as a result of metallurgical research, have been tailored for longer life and greater efficiency. The increased operating speed in the manufacture of resisting elements will necessitate wire with flawless unwinding and uniform physical properties.

Without a doubt electronics has, under the impetus of the emergency, skyrocketed into a major position in industry. Fine wire, the working medium of this industry, will have considerable demand. The applications of electronics will be primarily in the realm of control and recording mechanisms for new and various manufacturing operations, and, as such, will unquestionably have extensive use in the postwar world. Most of the fine wire used in electronic work will require exact size and shape, special finishes and high sensitivity to changes in electrical energy. Its use as recording wire is one of the many applications which fine wire will have in this field.

Over the past few years the rubber industry has been working on a development to prolong the life of automobile tires by re-enforcing the fabric with fine high tensile wires. The requirements of this development, which may be a single wire interwoven with cotton fabrics or interlaced cable cords, will be high strength, flexibility and high elasticity. The volume of fine wire for this purpose may assume primary significance in fine wire production. Alloy steel fine wire in brush manufacturing has had, in recent years, considerable usage. The use of beryllium copper and stainless steel in both heat treatable and non-heat treatable grades has found application in special-purpose brushes.

Determination of Tungsten and

By C. M. JOHNSON
Chief Chem. Labs., & Lab. Ceramic Ware Dept.
Crucible Steel Co. of America

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IN the determination of tungsten and columbium, when alloyed together in stainless steels containing titanium, molybdenum and about 18 pct chromium and 10 pct nickel, the tungsten and columbium must be separated to perform an analysis by the hydroquinone color method, because both elements show a brown color. In the usual gravimetric methods of analysis, columbium also interferes with tungsten determination and the two must be separated.

When crude, SiO_2-free, tungstic oxide is fused with sodium carbonate to obtain the Fe_2O_3 correction, sodium columbate dissolves in water, together with the sodium tungstate, and would be included as W in the determination. However, the presence of Ti in crude WO_3 does not interfere with the usual gravimetric procedure, since like Fe_2O_3, the Ti is insoluble in the warm water solution of the carbonate fusion. The Ti precipitate is somewhat soluble in hot sodium carbonate solution.

Procedure

Two to 2.5-g samples of drillings are placed into 800-ml beakers and dissolved in a mixture of 45 ml conc HCl and 15 ml conc HNO_4. The solution is heated very slowly until all the metal is decomposed; cooled; and to it added a mixture of 500 mg $KClO_3$ and 6 ml $HClO_4$. After taken to dryness and baked for 15 min, it is cooled, 30 ml conc HCl added, and boiled until only 10 ml solution remains. This is cooled, a mixture of 150 ml H_2O and 10 ml cinchonine added, stirred, and heated just to boiling. The liquid is cooled to room temperature and filtered through No. 40, 11-cm papers, and subjected to 70 washings with cinchonine.*

* *Cinchonine wash:*
10 *ml stock solution* (**25 *g cinchonine in* 200 *ml* 1:1 *HCl*)**
500 *ml* H_2O

The filter paper and precipitate are burned in weighed 30 to 40-ml platinum crucibles, cooled, and 7 drops of H_2SO_4 (1:7) and then 4 ml HF added. This is evaporated to fumes of SO_3 and to dryness on a graphite bath, heated to a dull red color, cooled and weighed. This weight "A" includes WO_3, Cb_2O_5, some Fe_2O_3 and Ta_2O_5 and perhaps TiO_2.

In order to determine the WO_3 present it must first be eliminated from the other oxides represented by weight "A," and then calculated by difference. The removal of WO_3 is accomplished by the following method. The material of weight "A" is fused in a crucible with 10 g $KHSO_4$, by heating over a Meeker burner until melted and the first white fumes appear. (heating must halt at this point or platinum oxide will form and contaminate the fusion). After the fusion has cooled, the crucible is placed into a 600-ml beaker, 200 ml H_2O plus 2½ cubes (or 10 g) ammonium carbonate added, and heat applied until the salts are completely dissolved. When the solution has cooled, the crucible is removed and 1:1 HCl is added until litmus paper shows an acid condition, after which 1:1 NH_4OH is added until the solution is slightly ammoniacal. After boiling for 5 min, it is cooled and filtered through No. 40, 11-cm papers (double). In order to remove all potassium salts, the precipitate is washed about 70 times with a solution of 3 g ammonium nitrate dissolved in 500 ml H_2O.

The washed papers are burned off in the same crucibles previously thoroughly rinsed with hot H_2O. The filtrate and washings are treated with excess 1:1 HCl and 1:1 NH_4OH in slight excess, heated to boiling, and allowed to stand overnight. If any more precipitate forms, it is filtered out, washed with ammonium nitrate wash and burned with the main precipitate (the filtrate and washings (C) are held for later use). The weight (B) of two precipitates include Cb_2O_5, some Fe_2O_3, Ta_2O_5, and TiO_2 or, in other words, the same constituents as weight "A," except for WO_3. Hence, by deducting weight "B" from weight "A," the weight of WO_3 is determined.

To correct weight "B" for the presence of Fe_2O_3 and TiO_2, the procedure must be continued further. Residue "B" is fused with 8 g sodium carbonate until all activity ceases (clear melted), cooled and placed in a porcelain dish. To this is added 100 ml H_2O and heat applied until the fusion is dissolved (remove the crucible and rinse its surface films into the dish). The solution is cooled slowly to room temperature and a little paper pulp is stirred into it. No. 31, 11-cm paper is used to filter this mixture and ammonium nitrate solution to remove (about 70 washings) all traces of sodium carbonate. After burning off the washed paper, the precipitate is cooled and weighed. This weight "C" represents impurities such as Fe_2O_3 and TiO_2. Deducting weight "C" from "B" gives, by difference, the weight of Cb_2O_5, which can be calculated to a percentage of Cb.

$$\frac{Cb_2O_5 \times 70}{\text{wt. of sample}} = \text{pct Cb}$$

The filtrates and washings (C) referred to above contain all of the W in the form of ammonium tungstate. From this solution the W can be determined by either the hydroquinone color method, or by direct separation as tungstic acid (by evaporation to dryness in excess of HCl) by the usual methods. The following recoveries were obtained by the gravimetric procedure just described; that is, the W was determined by difference and the Cb by direct separation.

Columbium in Stainless Steels

Last week the author outlined the procedure followed in the color determination of tungsten, titanium and columbium, by hydroquinone, in alloy steels. To supplement this information, the author discusses herein the determination of tungsten and columbium together in stainless steels containing titanium, molybdenum and about 18 pct chromium and 10 pct nickel.

Synthetic Mixtures of Known Amounts

Gravimetric No. 1:

N.B.S. Std. 123a — 1 g (0.75 pct Cb) = 0.0107 g Cb_2O_5 added
N.B.S. Std. 123a — 1 g (0.11 pct W) = 0.00138 g WO_3 added
N.B.S. Std. 50b — 0.10 g (18.06 pct W) = 0.02270 g WO_3 added

0.02408 g WO_3 added

N.B.S. Std. 121a (1 g) used as a source of Ti
0.015 g MoO_3 as a source of Mo

Results WO_3		Results Cb_2O_5	
42.5076 g		42.4829 g	
42.4699		42.4699	
0.0377 g	$WO_3 + Cb_2O_5 + Fe_2O_3$	0.0130 g	$Cb_2O_5 + Fe_2O_3$
0.0130 g	$Cb_2O_5 - Fe_2O_3$	0.0021 g	Fe_2O_3 correction
0.0247 g	WO_3 by difference	0.0109 g	Cb_2O_5 found
0.0241 g	WO_3 added	0.0107 g	Cb_2O_5 added

Gravimetric No. 2:

N.B.S. Std. 123a — 1.25 g (0.75 pct Cb) = 0.00937 g Cb = 0.0134 Cb_2O_5 added
N.B.S. Std. 123a — 1.25 (0.11 pct W) = 0.001375 g W = 0.00173 g WO_3
N.B.S. Std. 50b — 0.12 g (18.06 pct W) = 0.02257 g W = 0.0284

0.02394 0.0301 g WO_3 added

Results WO_3		Results Cb_2O_5	
44.6020 g		44.5723 g	
44.5555		44.5555	
0.0465 g	$WO_3 + Cb_2O_5 + Fe_2O_3$	0.0168 g	$Cb_2O_5 + Fe_2O_3$
0.0168	$Cb_2O_5 + Fe_2O_3$	0.0033 g	Fe_2O_3 correction
0.0297 g	WO_3 found	0.0135 g	Cb_2O_5 found
0.0301 g	WO_3 added	0.0134 g	Cb_2O_5 added

Gravimetric No. 3:

N.B.S. Std. 123a — 1.5 g (0.11 pct W, 0.75 pct Cb) = 0.00165 g W = 0.00208 g WO_3
N.B.S. Std. 50b — 0.15 g (18.06 pct W) = 0.0271 g W = 0.0341 g WO_3

0.03618 g WO_3

N.B.S. Std. 123a — 1.5 g (0.75 pct Cb) = 0.01125 g Cb
= 0.0161 g Cb_2O_5

Results WO_3		Results Cb_2O_5	
43.9096 g		43.8754 g	
43.8566		43.8566	
0.0530 g	$WO_3 + Cb_2O_5 + Fe_2O_3$	0.0188 g	$Cb_2O_5 + Fe_2O_3$
0.0188 g	$Cb_2O_5 + Fe_2O_3$	0.0026 g	Fe_2O_3
0.0342 g	WO_3 found	0.0162 g	Cb_2O_5 found
0.0362 g	WO_3 added	0.0161 g	Cb_2O_5 added

(CONTINUED ON NEXT PAGE)

Synthetic Mixtures of Known Amounts—Continued

Gravimetric No. 4:

N.B.S. Std. 123a — 2.0 g (0.75 pct Cb) = 0.015 g Cb = 0.0214 g Cb_2O_5
N.B.S. Std. 123a — 2.0 g (0.11 pct W) = 0.0022 g W = 0.0028 g WO_3
N.B.S. Std. 50b — 0.15 g (18.06 pct W) = 0.02709 g W = 0.0341 g WO_3

Total 0.0369 g WO_3

Results WO_3		Results Cb_2O_5	
42.6644 g		42.6270 g	
42.6049		42.6049	
0.0595 g	$WO_3 + Cb_2O_5 + Fe_2O_3$	0.0221 g	$Cb_2O_5 + Fe_2O_3$
0.0221 g	$Cb_2O_5 + Fe_2O_3$	0.0016 g	Fe_2O_3
0.0374 g WO_3 found		0.0205 g Cb_2O_5 found	
0.0359 g WO_3 added		0.0214 g Cb_2O_5 added	

Tungsten by Evaporation

The gravimetric determination of W by evaporation of the ammoniacal filtrates from the Cb (see last paragraph above under heading, Procedure) is accomplished as follows: The filtrates are boiled down to 40 ml in an 800-ml beaker (with cover partly on) and cooled. After the addition of a mixture of 15 ml conc HCl and 500 mg $KClO_3$, the resulting solution is taken to dryness, baked for 10 min and cooled. An addition of a mixture of 10 ml 1:1 HCl and 50 ml H_2O is then made and the mixture heated until all the salts are dissolved. After a mixture of 150 ml H_2O and 10 ml cinchonine has been added, the mixture is stirred and filtered cold. The precipitate is washed with cinchonine wash (see above) about 70 times and the papers then burned off in a weighed crucible. It is advised that 10 ml cinchonine be added to the filtrate, the solution heated to boiling and allowed to stand overnight to determine whether any more W precipitate will form. The SiO_2 is then removed by adding a mixture of 6 drops 1:7 H_2SO_4 and 1 ml HF and heated to redness. When cooled and weighed, the calculation is made as follows:

$$\frac{WO_3 \times 79.3}{\text{wt. of sample}} = \text{Pct W}$$

In three tests performed by this method, with Co, W, Mo and Ti added by using portions of N.B.S. Stds. 123a and 50b, the following results were obtained:

stoppered flask, diluted to the mark and mixed by inverting the flask. Then 5 ml of this solution is drawn off and added to a 150-ml beaker containing 40 ml of 5 pct hydroquinone solution. While still hot, 2 ml of $SnCl_2$ solution are added, and the liquid then cooled for about 15 min in a trough of running water at 60° to 70°F. The Klett photoelectric colorimeter is then used for the W determination in the same manner as described in the previous issue of THE IRON AGE in an article by the same author. Sample calculations are illustrated as follows:

KLETT COLORIMETER CALCULATIONS
(Colorimeter balanced with H_2O)

Pct W in Stds.	Divisions on Klett
Std. No. 1—0.0241 g WO_3 (1.91 pct W)	130
Std. No. 2—0.0301 g WO_3 (2.39 pct W)	147
Std. No. 3—0.036 g WO_3 (2.87 pct W)	165

Std. No. 3 = 2.87 pct W — 165 divisions
Std. No. 1 = 1.91 pct W — 130 divisions
0.96 — 35 divisions

$$\frac{0.96}{36} = 0.0275 \text{ pct W per division}$$

Std. No. 3 = 2.87 pct W — 165 divisions
Std. No. 2 = X pct W — 147 divisions
18 divisions

$18 \times 0.0275 = 0.49$ pct W

Std. No. 3 = 2.87 pct W
Std. No. 2 = 0.49 pct W
2.38 pct W found
2.39 pct W added (Std. No. 2)

32.4258 g	43.8983 g	43.6608 g
32.3899	43.8500	43.6028
0.0359 g WO_3 found	0.0483 g WO_3 found	0.0580 g WO_3 found
0.0368 g WO_3 added	0.0499 g WO_3 added	0.0603 g WO_3 added

Tungsten by Color

The determination of W by the hydroquinone color method can also be made using the ammoniacal filtrates. The filtrate is transferred to a 500-ml glass-

Acknowledgment is due to Mr. L. L. Ferrall, director of metallurgy, Crucible Steel Co. of America, for securing permission to publish this article.

New Equipment . . .

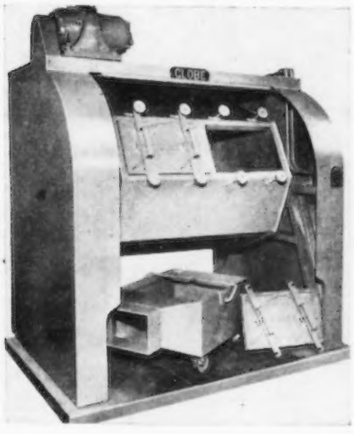
Finishing

. . . Various developments of general utility in all types of finishing including deburring machines, enamel strippers, automatic filters, cleaning units, umbrella plugs and many other devices are described in this week's digest of manufacturers' announcements.

A REMARKABLY fast, non-inflammable paint remover has been announced by *Kelite Products, Inc.*, Los Angeles. This material is said to be safe on any metal or hardwood surface and provides the speedy removal of all types of paint and enamel. The outstanding quality of Kelite N.F. Remover is its amazing speed. As many as 8 coats of paint can be penetrated, loosened and removed, it is claimed, in one step, taking no longer than 30 min. Complete removal of one or two coats can be accomplished in 10 min. Removal after penetration is easy in that paint or enamel can be sheeted off by a pressure rinse.

Deburring Machine

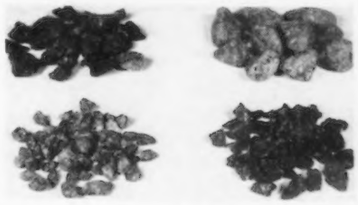
DESIGNED to provide mass production deburring by increasing output as much as 2100 pct over hand labor, the Globe Burr-Rite machine, announced by *The*



Globe Stamping Div., Hupp Motor Car Corp., Cleveland, features double and triple compartments which can perform two operations, polishing and deburring, simultaneously. The handling of parts has been simplified by the installation of a new hoist pan, and large lightweight doors make loading and unloading easier. To maintain continued mass production the large compartments can be relined with tough, hard maple liners without removing the shell. It is available in three models.

Tumbling Abrasive

ALUNDUM abrasive has been announced by *Norton Co.*, Worcester, in a special form for use for wet tumbling. It is said to



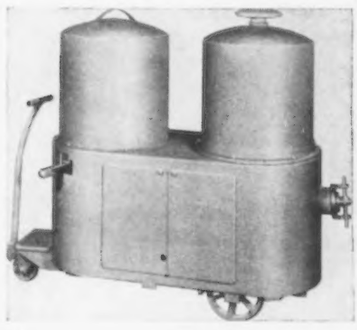
be a hard, heavy, tough and fast cutting aluminum oxide product that is proving excellent for cleaning, deburring, finishing and the development of radii on a wide variety of metal parts. The hardness of this abrasive is claimed to provide continuous fast cutting action without glazing over. Microinch finish can be easily maintained or improved. This product is available in four size groups, namely, ¼-½ in., ½-¾ in., ¾-1 in., and 1-1½ in. diam, either untumbled or tumbled (sharp corners rounded). The illustration shows the smallest and largest sizes in tumbled form and the other two sizes untumbled.

Enamel Stripper

THE development of a stripper called Enthone Enamel Stripper S-300 for removal of many types of organic coatings, has been announced by *Enthone Co.*, 442 Elm St., New Haven, Conn. Synthetic enamels such as alkyds, melamine, and urea formaldehyde coatings are said to be readily removed with this stripper. This product can be used full strength at room temperature, and it is also a powerful stripper when used diluted with water and the mixture heated in the temperature range of 150 to 180°F. There is no attack upon the base metal and such active metals as aluminum, zinc, and tin are unharmed. Phosphate coatings and anodized coatings are also unharmed by this stripper.

Automatic Filter

THE Udylite automatic filter for plating room service has been announced by *The Udylite Corp.*,

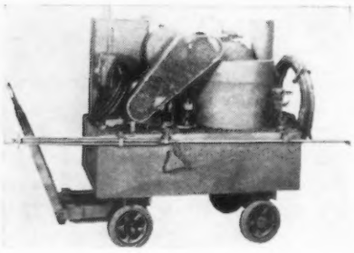


1653 E. Grand Blvd., Detroit 11. It may be used either for continuous or intermittent filtering, and also serve to filter or transfer plating solutions easily and quickly without spilling any of the liquid. The en-

tire unit is fully enclosed and easy to keep clean. It is also easily portable having truck wheels large enough and with sufficient tread to roll over duck boards easily. The heart of this unit is said to be a specially designed positive plug type multiport valve which has just one operating control lever. By manipulating this one lever it is possible to prime the pump, feed slurry, backwash, build filter cake, clean the filter or transfer a solution from one tank to another.

Cleaning Unit

KNOWN as Oakite Vapor Cleaning Unit, a quality-engineered, multiple-duty steam cleaning unit has been announced by *Oakite Products, Inc.*, 30H Thames St., New York 6. This unit is said to be a self-contained, down-draft flame, oil-fired, enclosed coil type steam generator that delivers hot vaporized cleaning solutions under



selective pressures up to 200 lb for the speedier, easier removal of grease, grit, grime, paint and other deposits from surfaces. A wide range of fuel oils such as No. 1, 2 or 3 fuel oil, kerosene or gasoline, may be used to operate the unit. Due to its flexibility of steam pressures, this unit may be used on many different types of light and heavy-duty cleaning. Features claimed for this unit are: (1) rapid steam generation; (2) unusual solution tank capacity; (3) effective operation of two steam guns simultaneously; (4) wide flexibility in its application to various cleaning operations, and (5) safety against fire.

Protective Coating

A PROTECTIVE coating resistant to acids, alkalies, chlorides, oils, brine, oxygen, gasoline and alcohol solutions, called Cotoid, has been announced by the *Lithgow Corp.*, 333 W. 40th Pl., Chicago 9. This is a recently developed formula based on synthetic resin—a thermo-plastic—in which its low water absorption and inert properties are said to inhibit corrosion. The application of this coating results in a tough, hard, elastic finish, which after air or force drying, is tasteless and odorless. It has been found

practicable for protecting walls, wood or steel structural work, in food processing plants, wineries, breweries and paper mills. It can be used for coating inside and outside surfaces of concrete, steel or wooden tanks used for corrosive solutions, brines and alkalies. Application by spraying is recommended, but it can also be applied by dipping, flowing or roller coating.

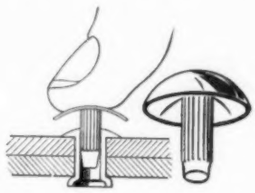
Flexible Baking Enamel

UNUSUALLY fast drying, and possessing a very high degree of flexibility, a baking enamel, known as Porciflex, has been announced by the *H. V. Walker Co.*, Elizabeth, N. J. Applied by spray, dip, or roller coating machine, this new finish is baked at speeds ranging from 1 min at 450° F for sheet steel, to 15 min at 275° F for other types of work, and is well adapted

to infra-red baking. It is said to produce a porcelain-like finish, having a high degree of resistance to acids, alkalis, oils, and greases, and which will not crack or flake when struck. The high degree of flexibility is shown by the specimen in the lower part of the illustration which has been bent, after baking, to the ultimate angle of stress, without any cracking or peeling of the finish. It is available in clear, black, white and all colors, and the white has a minimum tendency to yellow with age.

Umbrella Plug

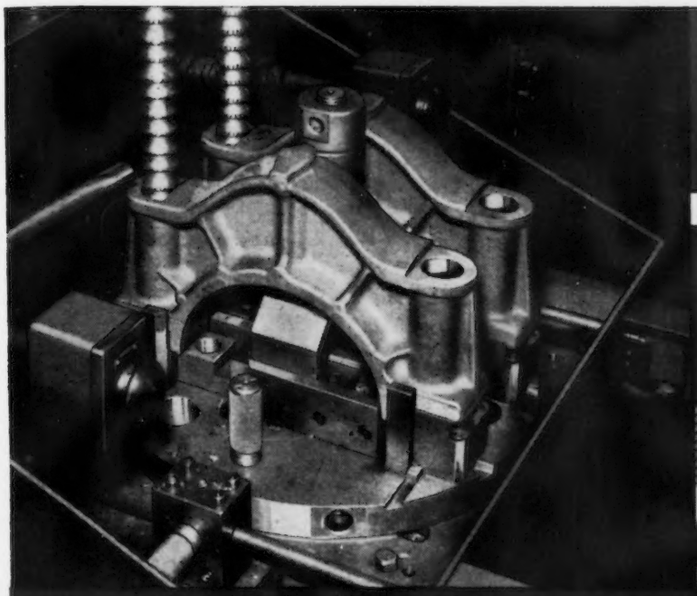
AN Umbrella Plug has been added to the Cherry Rivet line of fasteners, announced by *Cherry Rivet Co.*, 231 Winston St., Los Angeles 13. Typical application examples are said to be enameled signs, furniture, smooth surface household appliances and industrial equipment. These plugs fit into the center of the hollow type Cherry Rivets and are claimed to furnish an attractive, smooth cap completely covering the head of the rivet. They are available in aluminum, copper or plastic, and can be colored to match or harmonize with the surrounding surface. The plugs are easy to insert, and the shank is knurled and tapered and fits tightly into the hollow center of the rivet. The pointed end of the shank is in-



serted into the installed rivet, and the plug is pushed in by hand.

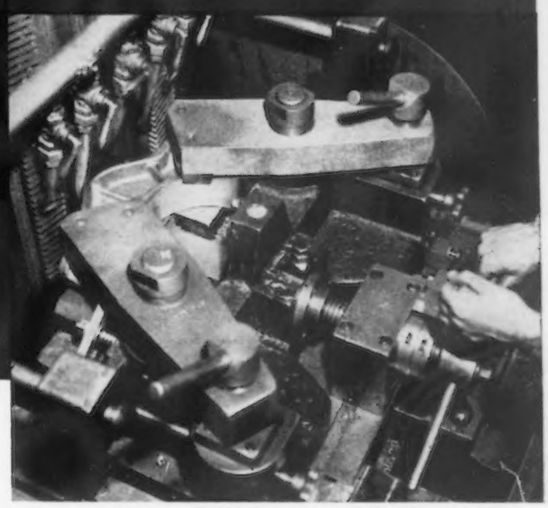
Metal Cleaner

MINIT Kote is an original development announced by *Klem Chemical Works*, 14401 Lanson Ave., Dearborn, that makes it possible to effectively prepare metal surfaces for painting in one operation. This product is said to be a phosphoric acid emulsion having high detergency properties. It is claimed to merit consideration because through its use parts can be cleaned and phosphate treated in one operation instead of the usual three or more operations. This product can be used in a one stage washer at a 2 pct volume concentration and at a temperature of 160 to 180° F. It may also be used as a rinse after the usual alkali cleaning operation, and instead of alkali in a steam gun or steam cleaning operation. Minit Kote while acidic in nature does not require special equipment and may safely be used in standard washers.



Finish broaching of four bolt holes (1-9/16" dia.) in two forged steel caps is done in less than a minute by Oilgear Vertical Pulldown Broaching . . . which proved faster and more accurate and eliminated defect-producing scratch marks.

3/16" of stock broached from two bolt bosses simultaneously on Oilgear Vertical Broaching machine which also broaches 1¼" stock from two lock-fit and joint-face surfaces measuring 2¾ x 2¾".



In removing metal and finishing surfaces such as these

. . . Oilgear broaching reduced operations and saved $3872.00 a month

How much can Oilgear Save for YOU?

The parts pictured in the two photographs shown above are main bearing cap forgings used in a well-known Diesel engine. Formerly, these forgings had to be milled . . . planed . . . hand-scraped . . . drilled . . . reamed . . . and bored before they were ready for assembly. Now, with Oilgear Broaching, the task is much simpler. Two bolt bosses, two bolt holes, lock-fits and joint-faces are rough and finished broached. That is all.

The consequences are amazing: More than $60 saved in direct costs for each set of bearing caps, an average of $3872 a month; an abrupt production jump; a far lower investment in equipment; lower tool cost per cap; closer machining tolerances for faster, easier assembly; better finish; less maintenance; less part distortion; less floor space; less power consumed. Oilgear Broaching may well do as much for you.

The time has come for every industrial executive again to take costs seriously. The time has come for every industrial executive to investigate Oilgear Fluid Power Broaching for the tremendous impact it can have on costs of every sort. Get the facts *NOW*. THE OILGEAR COMPANY, 1303 W. Bruce St., Milwaukee 4, Wisconsin.

OILGEAR BROACHING MACHINES

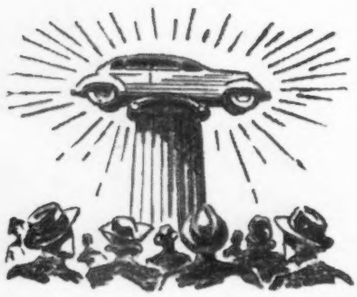
Oilgear manufactures a complete line of broaching machines . . . horizontal and vertical for every internal and external broaching operation. The superiority of Oilgear Broaching Machines results essentially from the recognized superiority of Oilgear Fluid Power. High broaching and return speeds are independently adjustable. Simple push-button controls provide manual, semi-automatic or full automatic operation. Machine, power system and tools are fully protected against overload. Power is consumed in proportion to speed and load only.

Oilgear Fluid Power

Assembly Line . . . .

STANLEY H. BRAMS

• Building programs given impetus in auto companies after pause in strike wave makes go-ahead on passenger car production more certain . . . Chevrolet, Nash, Studebaker and Ford outline expansion programs.



DETROIT—Now that the new wage levels sought by the CIO United Auto Workers Union have pretty well stabilized in the passenger car companies, and, as a result, now that the production outlook is somewhat clarified, the trend of the moment is a go-ahead on facilities expansion. Within the past week four different companies have announced enlargement programs.

Chevrolet has inaugurated a program of warehouse construction and expansion to improve parts supply service to GM car dealers throughout the country.

At Chicago is being built a one-story steel and concrete building of 90,000 sq ft, to restore a warehouse discontinued during the war. At Minneapolis a similar building is expanding warehouse facilities from 34,000 to 104,000 sq ft. At Baltimore a 104,000 sq ft building is being erected to replace a warehouse discontinued during the war, and at San Antonio a 30,000 sq ft structure is replacing a building half that size which now is under lease.

Ford Motor Co. is moving its truck and bus production in the Detroit area from the Rouge plant to Highland Park, and is spending more than $2 million to accomplish the transfer. The move will add 2500 employees to the 10,500 already employed at the Highland Park plant.

Buses will be rolling off the new line by midsummer and trucks by mid-October. The move was prompted by the decision to double production of Ford and Mercury passenger cars, station wagons and Ford trucks in Detroit area plants. Henceforth, only passenger car and station wagon output will be maintained at the Rouge plant "B" building.

A new "U" shaped truck assembly line is now being installed at Highland Park, 1410 ft long and with daily capacity of 500 trucks —somewhat more than twice the capacity of the truck line currently in use at the Rouge.

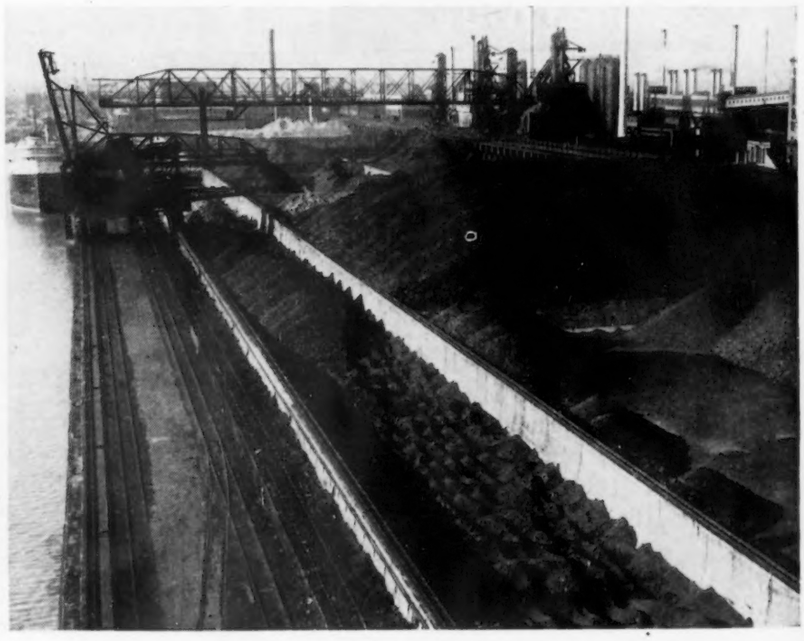
The present Rouge truck line will be used for passenger car production, increasing to three the number of lines employed for passenger cars at the Rouge, making "B" building the largest assembly unit now operated by Ford.

The present bus assembly line at the Rouge plant, 540 ft long and with capacity of 20 units daily, will be moved intact to Highland Park. Thereafter, at Highland Park, four floors of the 6-story structure, or approximately 550,000 sq ft, will be utilized for truck assembly operations. The assembly line will be located on the first floor, with fabrication, metal finishing, degreasing, phosphate treatment, painting and storage facilities on the upper floors.

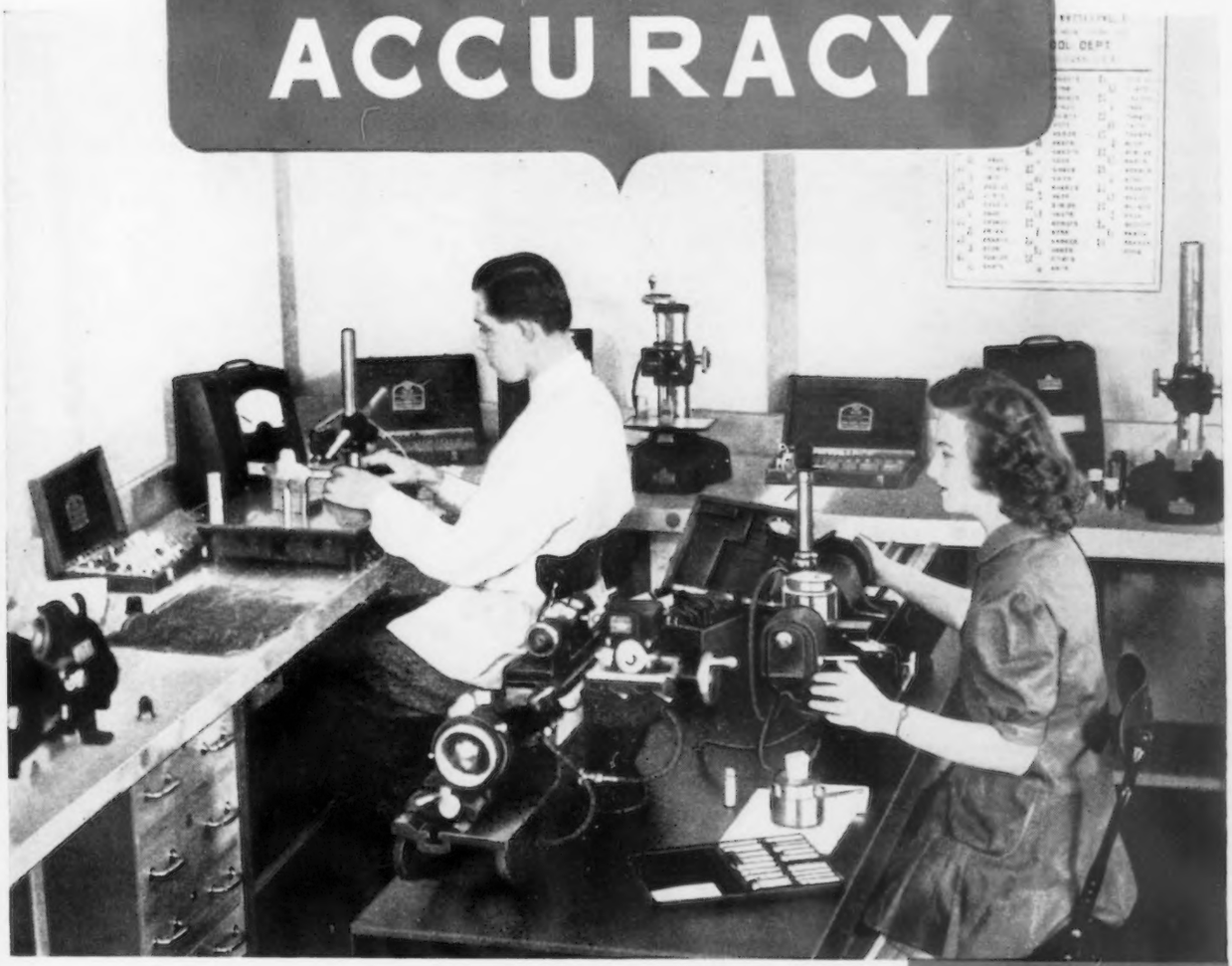
TRUCKS also figure in the first step in an enlarged manufacturing expansion program at Studebaker. A new $1,500,000 truck cab and pickup body factory went into operation last weekend, completely separating truck and passenger car assemblies.

The new truck building, two stories high and 625 ft long, gives Studebaker one of the most modern plants in the industry. Handling ease has been particularly improved, with parts starting from loading docks and being moved progressively through framing fixtures, water-conditioned spray booths, bonderizing and drying ovens, and an upholstery and trim department exclusively devoted to truck installations. Included in the building program is 500 ft covered railway dock which will

IT WON'T BE LONG NOW: *Coal supplies at the Ford Motor Co. for use at the Rouge plant look fine here, but with the coal strike on and with the heavy rate of consumption, blast furnaces in the background will be shut down if the strike lasts much longer.*



How to Maintain ACCURACY



Somewhere in every shop, whether large or small, is a place devoted to precision measurement. Whatever its size, this measuring control is one of the most essential places in your plant.

The importance of precise measurement increases as the tolerances become closer. Industry is finding out that when the working limits have been selected and adhered to properly, the product will assemble easily and quickly, thus lowering the production cost.

The war set new standards of measurement. Peacetime competition may require even higher ones.

What are today's
CRITERIA OF MEASUREMENT?

If you are seeking the answer to this question, or if you are planning a "Standards Room" for the control of measurement in your plant, we want you to have this new booklet.

"Criteria of Measurement" is illustrated in full color. It tells you how to set up your own central measuring laboratory and describes the basic measuring equipment that will be needed in it.

Write for "Criteria of Measurement" on your firm letterhead.

PRATT & WHITNEY

Division Niles-Bement-Pond Company

WEST HARTFORD 1, CONNECTICUT

serve both the truck cab factory and the passenger car body factory which it joins.

Concurrently Studebaker introduced its 1946 commercial cars, including offerings in the light and medium fields. The line is available in ½-ton, 1-ton, 1½-ton sizes, and a variety of pickup, stake and cab and chassis models.

Nash-Kelvinator Corp. has purchased a plant at El Segundo, Calif., for production of Nash automobiles and trucks and Kelvinator appliances. The new plant will service the entire western seaboard region. Operations will begin late this fall, furnishing employment at full schedules to more than 2400 persons.

The new Nash plant, located on a 30-acre site, was purchased from War Assets Corp. The Defense Plant Corp. built the factory during the war for operation by North American Aviation, Inc. Recently appraised at $1,835,000, it has 475,000 sq ft of floor space consisting of factory, cafeteria and office buildings.

Studebaker already has a modest West Coast assembly operation as has Willys, although neither of these producers have put them into operation since the war ended. Hudson and Packard are the only two automobile producers without West Coast assembly points.

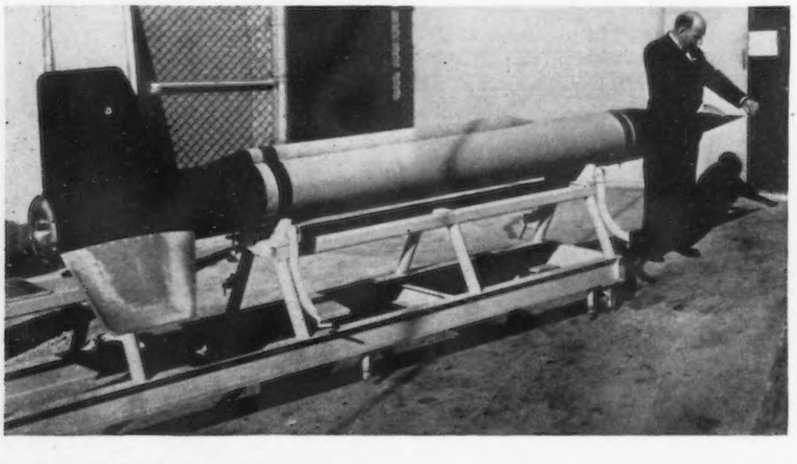
The West Coast, incidentally, has also cast a beckoning finger at International Harvester Company's truck division, which recently purchased space at Emeryville, Calif., and will set up operations in the future. On the tentative side, Packard Motor Car Co. intends to manufacture cars in Windsor, Ont., for distribution through the Empire as soon as a plant site becomes available, and Studebaker has bought land and buildings at Hamilton, Ont., for similar assembly and distribution.

Further in the week's budget of construction and expansion news is the word that Martin-Parry Corp. has bought the American Propeller Corp. plant at Toledo, Ohio, including approximately 500,000 sq ft, and indicating that Martin-Parry has larger aspirations in the truck stamping and body parts field than hitherto. The company will continue to maintain its headquarters manufacturing at York, Pa., and executive offices will remain in Detroit, where the Fisher Bros., most important single interest in Martin-Parry, can keep a weather eye on developments and proceedings.

SOME interesting observations on postwar factories were made recently before the Rochester Society of Architects by George H. Miehls, president of the Albert Kahn organization. Mr. Miehls predicted that new plants will be located outside of congested urban districts, permitting ample distribution of facilities, provision for expansion, and available to proper public transportation as well as adequate highways for private transportation. One important characteristic of new plants, he said, would be flexibility in layout so that efficiency would be possible without major structural alterations when profits are limited as they are today by artificial price control or as they will be later by competition. Efficiency will be achieved, he said, by horizontal conveyance of materials from receiving to manufacturing to assembly to shipping, a system applicable to almost all industries, according to the speaker.

He said, however, that building today was beset with many difficulties and spoke of the near-impossibility of getting price quotations from steel fabricators, the unavailability of materials, the slow pace of building, and other problems.

RECORD BREAKING ROCKET: *Glenn Bassett, assistant project engineer at Douglas Aircraft Co., examines a new ionosphere rocket which has soared to 230,000 ft or 43½ miles in search of new weather secrets. The rocket, which has a parachute attachment to bring it back to earth, was developed by the California Institute of Technology with Mr. Douglas assisting in its construction.*



Studebaker Claims Settled

Washington

• • • **Announcement has** been made by the War Dept. of the settlement of all claims involved in the cancellation of approximately $300 million worth of war contracts with the Studebaker Corp. The War Dept. said that it and Studebaker wound up in seven months the work necessary to approve all claims and dispose of all inventory.

Pretermination agreements, settling in advance many of the problems presented in the termination claims, it was pointed out, assisted materially in speeding up the settlements. All termination inventory was out of the Studebaker plants.

Four major contracts were let by the government to Studebaker during the war. These included cost-plus-fixed-fee contracts for Flying Fortress engines and the experimental project and fixed price contracts for military trucks and the tracked carrier, Weasel. According to the War Dept. statement, settlement payments for the four totaled about $11.5 million and included 4197 claims from 1334 subcontractors.

Announcing

A NEW AND DIFFERENT AIR-HARDENING TOOL STEEL

Carpenter VEGA

U. S. Pat. 2,355,224

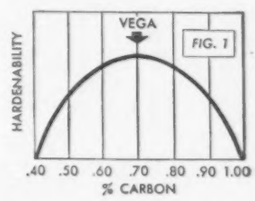
Tool makers have long expressed the desire for a *tried and proved* non-deforming die steel that would combine the deep-hardening characteristics of air-hardening steels with the simplicity of low temperature heat treatment possible with many oil-hardening steels. VEGA is a new type of air-hardening steel developed in the Carpenter laboratories to meet this need.

HARDENS IN VERY HEAVY SECTIONS

VEGA will harden to Rockwell C-60 from surface to center in sections as large as 8" diameter by cooling from 1550° F in a free circulation of air. In smaller diameters, hardness values will be slightly higher.

Carpenter's metallurgists discovered that the hardenability of this type of steel is influenced in an unusual way by Carbon content. As shown in Fig. 1, maximum hardenability is obtained at a Carbon content of about .70%. This is particularly noticeable in heavy sections. Further, percentages of other alloys were proportioned to afford the best combination for maximum hardenability and toughness.

VEGA combines, for the first time, the deep-hardening characteristics of air-hardening steels with the simplified, low temperature heat treatment of many oil-hardening types.



LOW HARDENING TEMPERATURE
Pack Hardening Not Required

VEGA can be heat treated from a temperature 200° F lower than the 5% Chrome air-hardening steels. Therefore, pack hardening and special high temperature furnaces are not required.

MINIMUM DISTORTION and SIZE CHANGE

When dimensional changes in heat treatment must be held to an absolute minimum, VEGA should be considered for the job. Properly hardened, VEGA will expand about .0005" per inch of length when air cooled at room temperature. Drawing at 400° F returns it to within .00025" of its original size.

VEGA ALSO GIVES YOU THESE EXCLUSIVE ADVANTAGES

GOOD MACHINABILITY • FREEDOM from EXCESSIVE SCALING
RESISTANCE to DECARB • EXCELLENT TOUGHNESS

Carpenter
AIR-HARDENING
TOOL STEELS
100% ACID-DISC INSPECTED

ASK FOR THIS NEW FOLDER It contains more information about VEGA, and the jobs it can do for you. Just drop us a line and your VEGA folder will be on its way to you.

THE CARPENTER STEEL COMPANY • 121 W. BERN STREET • READING, PENNSYLVANIA

BRANCHES AT: Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Hartford, Indianapolis, New York, Philadelphia, Providence, St. Louis

Washington . . . L. W. MOFFETT

• Reconversion Director's optimistic report used by President to urge extension price control and war powers . . . Other sources disturbed by strikes.

WASHINGTON — Declaring that the nation is in the midst of an unprecedented boom, President Truman has renewed his plea for prompt renewal of price control and other stabilization laws as weapons to avert inflation. Using Reconversion Director John W. Snyder's report for the first quarter of 1946 as a springboard for his appeal, the President stated:

"Our progress up to date will be completely nullified if we do not have an early extension of price control and stabilization laws. Without them, progress will be turned into economic chaos."

Mr. Snyder's report held that the shift from war to peacetime production is virtually complete, that production is at an all-time peak for either peace or war, that incomes from wages-salaries which dipped sharply at the end of the war had now risen to approximately pre-VJ-Day levels, and that extension of government controls for another year is essential for continued high production.

Barring serious work stoppages, according to the report, prospects for both labor and production are even brighter for the second quarter. Admitting that production in many lines had been seriously curtailed by the steel strike, the report held that:

"Major issues of wage and price adjustment have been met in a way to stimulate production without losing ground to inflation. Labor-management contracts established in many major industries under collective bargaining should assure uninterrupted production. Vigorous programs have been formulated to meet the most critical shortages."

As a result, the report saw the supply of goods and services to consumers continuing to increase during the second quarter.

"Exports will continue, construction activity will increase, and so in all probability will purchases of equipment and goods for inventory," Mr. Snyder said. "As a result, the total output of goods and services in the nation, although it may fluctuate for short periods, will continue at a high level."

Summing up its survey of the quarter, the OWMR finds that an upsurge in both demand and output has held expenditures virtually to the levels reached during the 1945 Christmas season. The drop in post-holiday buying which might normally have been expected to amount to $10 billion or more was balanced by increased commercial and industrial procurements. Current civilian production is placed by the OWMR at more than $150 billion worth annually while it set the present wage-salary income at approximately $82 billion.

Citing Commerce Dept. figures, the report gave January building and construction activities as five times the dollar volume of January, 1945, and February residential construction at eight times the dollar value for the same month a year ago. Holding the housing shortage as one of the nation's gravest problems, the OWMR could not see how this building volume could be maintained or how the Wyatt housing goal of 2.7 million units in 2 yr could be attained except through continued premium payments to builders.

A slow rise in unemployment is attributed mostly to the rise in nonwar production which brought an upturn in industrial employment. Partially offsetting the inflow of demobilized service veterans into civilian labor ranks were the continued Selective Service inductions and withdrawal of purely war workers from payrolls. For instance, during the last quarter of 1945, some 800,000 wartime workers, mostly women and youths, retired from the available manpower supply.

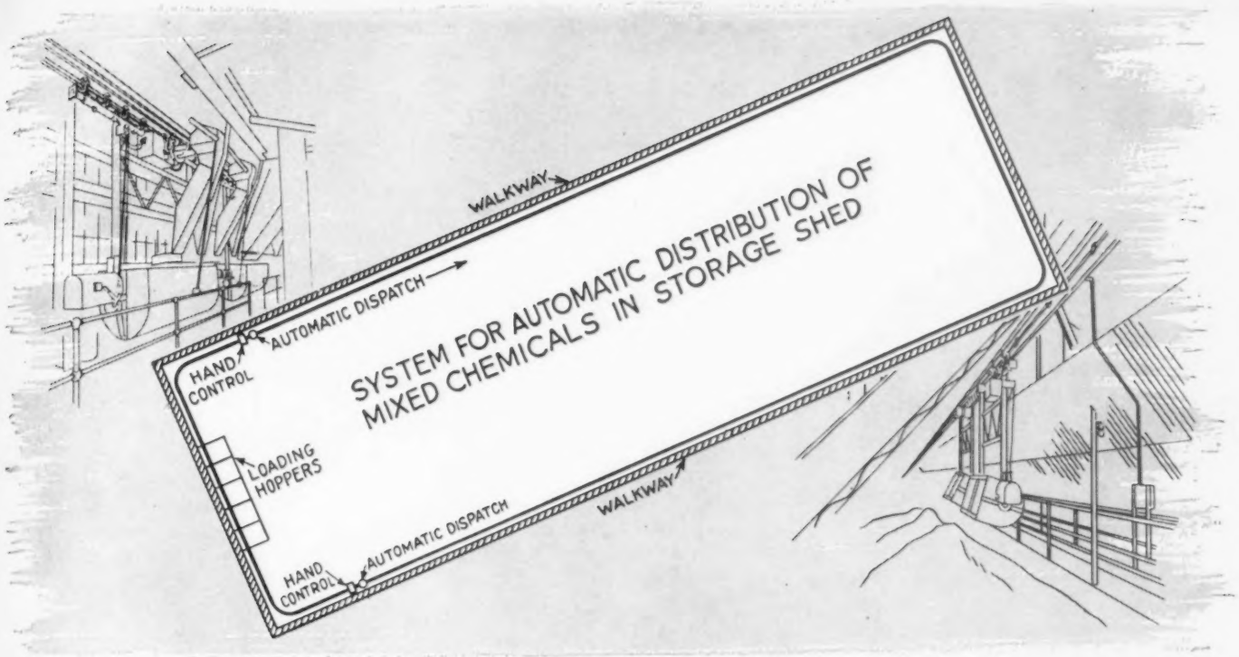
Data available to the OWMR indicated that despite work stoppages during the first quarter of 1946 "there were only 2.7 million active job-seekers in February; there may be 3 million now. The number may increase within the next three months but the average for the coming quarter will probably not be above 3.5 million." (Editor's Note: The OWMR report was written before the coal strike which added almost 400,000 to the unemployed.)

In releasing the report, President Truman said that it offered the best refutation of charges that control of wages and prices was retarding reconversion and peacetime production. As to where this huge production was going, he pointed out that shelves were empty and that inventories were at the lowest point in years.

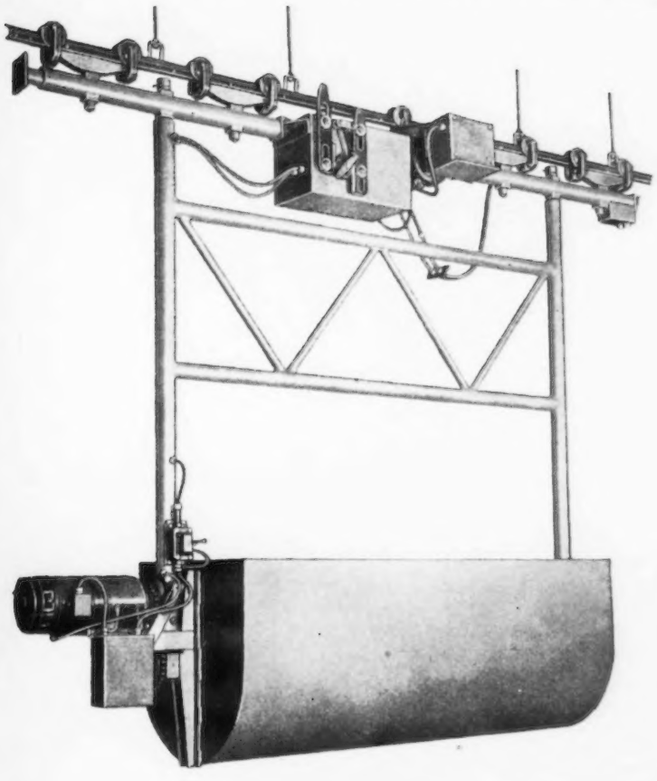
The stabilization authority renewal which is held by OWMR and the White House as necessary to hold these gains, continue production and head off inflation includes extension of the Second War Powers Act (the statutory basis of present government controls over inventories, exports, priorities, allocations and the rigid channeling of materials under Order No. 1 of the recent emergency housing program) until June 30, 1947; continuation of subsidies and premium payments up to $2 billion (the amount requested by the President) for the next fiscal year; and retention of price control for another year unless production approaches demand in the meantime.

At the time the optimistic report was being made public, industry was taking up a couple of notches in its belt against a possible prolonged coal strike. Even a short work stoppage in this quarter will cause repercussions in other industries, causing a loss of production which may take weeks to recover.

Inasmuch as wage increases have



10 Years of Automatic Operation



AUTOMATIC handling is not new with American MonoRail. This system has been in operation over 10 years. Since the original system was installed, two additional automatic carriers have been added. It has been continuously operated day-in and day-out with remarkably few replacement parts.

The automatic dumping bucket carries a cubic yard — travels to movable stop at 150 f.p.m. — dumps automatically — returns to loading station at 400 f.p.m. Movable stops are set to where material should be dumped. The carrier does all the dumping after being loaded and dispatched from the loading station.

Whatever your handling problem may be, there's an American MonoRail System best suited to your individual needs. Consultation in connection with any handling problem is available without obligation.

THE AMERICAN MONORAIL COMPANY

13103 ATHENS AVENUE CLEVELAND 7, OHIO

appeared so far as being of secondary importance, little optimism is shown by some Washington sources for a quick settlement. Large in importance is the demand for a welfare fund amounting to perhaps $50 million annually to be raised by the operators and administered by the union. Many here believe the operators will not give in on this demand and that Lewis may expect no help from the administration on this score.

Despite the report's prediction that federal expenditures and government payrolls would be substantially reduced during the second quarter, little real progress apparently is being made in either direction. As one bureau is lopped off a new one takes its place or its personnel is absorbed by a "temporary" agency in the process of expanding because of an "emergency." Thus the total overall federal employment remains at a virtual standstill.

In addition, it is now virtually certain that government employees are due to be voted a pay raise by Congress which now looks as if it might be 18 pct although proponents of a pay hike may have to settle for not less than 15 pct, adding considerably to cost of government. Taxpayers are not objecting to pay increases for needed government workers. They deserve a boost. Objection is made to the fact that there is a great excess of people on the payroll.

In March, for the first time over a long period, federal receipts were greater than expenditures by approximately $150 million. This is a healthy indication, although the surplus was relatively small in comparison with total expenditures and it was attained during a month when normally large tax payments figure heavily in Treasury receipts. Less will be received from this source in succeeding months.

A number of factors tend to delay the balancing of the budget, however. Reduction of federal income tax rates tend to reduce the receipts while special federal payments, including subsidies, mustering out pay for the services, the pending governmental salary increases, unemployment compensation, veterans' compensation and pensions, and many others work to continue expenditures.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

THEY DIDN'T EVEN GIVE YOU A FIRST GLANCE, LET ALONE A SECOND!
TO SEE HOW MUCH OF A LETDOWN THERE IS SINCE TH' WAR, HE'S MAKIN' SOME NEWSPAPERS LOOK LIKE HE'S STEALIN' A VISE ER LATHE!
NOT JUST A LETDOWN-- THE HULL BOTTOM'S FELL OUT! NOT LONG AGO IF YOU HAD A APPLE THEY'D PEEL IT!
AM CO
4-12 J.R.WILLIAMS
THE LOOSE GATE
COPR. 1946 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.

Coal Stoppage Ending Seen Remote as Ever

Washington

• • • **Negotiations between coal** operators and UMW President John L. Lewis were resumed Tuesday afternoon after a four-day recess but prospects of settlement of the strike remained as dim as they were from the outset.

The time of its ending is a matter of speculation only. Until Mr. Lewis discloses specifically what his demands are in the way of wage increases and working hours there is no means of estimating the duration of the strike.

A row between Mr. Lewis and President Harry M. Moses of the H. C. Frick Coal & Coke Co. brought to light an indication that Mr. Lewis is preparing to demand a big wage increase such as might well prolong negotiations. Mr. Lewis charged that Mr. Moses had proposed to him at a "secret" meeting a separate arrangement with the Frick mines, owned by the U. S. Steel Corp.

Mr. Moses vigorously denied charges of secrecy and double dealing. He was supported by coal operators who said Mr. Moses had advised them of his proposal for a separate arrangement with captive mines which had been made in order not to interrupt steel production.

Mr. Moses had proposed that any concessions subsequently granted in the national contract would be retroactive to Apr. 1. He rejected Mr. Lewis' suggestion that Mr. Moses break away from other coal operators and negotiate an entirely separate contract.

That Mr. Lewis apparently is preparing to ask for a big wage increase was indicated by Mr. Moses' statement that Mr. Lewis wants "folding money regardless of its impact on government wage price policy."

Boiler Prices Increased

Washington

• • • **A 10.5 pct increase** in manufacturers' ceilings, the first since March 1942 when prices were frozen at October 1941 levels, has been granted producers of cast-iron gas-burning heating boilers. Effective April 2, OPA said the action would bring prices of this item in line with other boilers.

SHEFFIELD Crush-Dressed GRINDING IS FASTER

APT PARTS

IVANHOE 1424

ZAGAR TOOL, INC.
23000 LAKELAND BOULEVARD · CLEVELAND 17, OHIO

October 1, 1945

Mr. C. J. Linxweiler, Mgr.
Machine Tool Distribution
The Sheffield Corp.
Dayton 1, Ohio

Dear Mr. Linxweiler:

Yes, of course, you have our permission to use the photograph sent you and we are very pleased to advise that our Sheffield Precision Thread and Form Grinder has been in constant use for well over a year on production of Class 3 ground threads for the aircraft industry. Production with the multiform crush dressed wheel is many times faster than with conventional single point grinding, even on the hardest of materials.

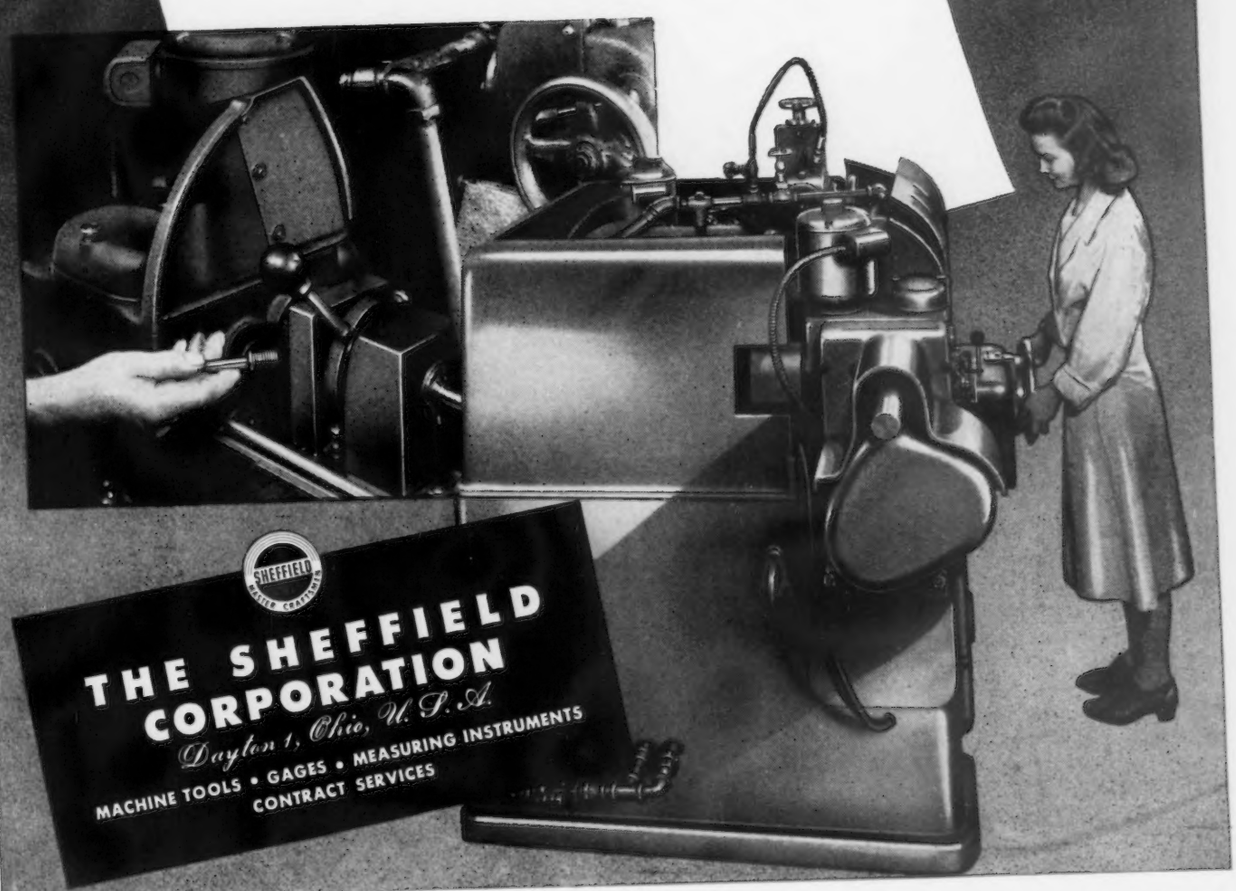
If we can be of any further assistance, please advise.

Yours very truly,

ZAGAR TOOL, INC.

J Nadon

F. Nadon
Sales Department



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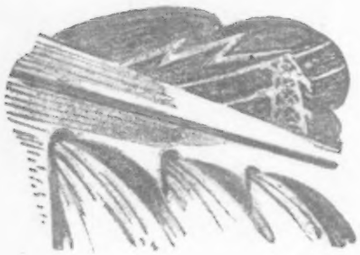
West Coast . . .

ROBERT T. REINHARDT

• Coal strike considered minor threat to western steel production . . . United Airlines to set up maintenance headquarters in San Francisco . . . Renton, Wash., DPC plant interests Northwest Airlines.



SAN FRANCISCO—Along with steel producers in other parts of the country western operators are concerned over the effects of a prolonged coal strike, but there is a prevalent belief that the situation will be straightened out before a coal shortage can seriously curtail local production.

Coking operations at the Ironton, Utah, blast furnace of the Columbia Steel Co. have already been curtailed, but the stock of pig iron at both the Torrance and Pittsburg, Calif., openhearths is reported as ample for 60 days of operation and in addition an unnamed quantity of pig is stored at Ironton. The Ironton blast furnace is operating at approximately 70 pct capacity on the coke being produced in the 30 ovens in operation. Byproduct gas from these ovens supplies residents and commercial users in the communities of Provo, Springville and Spanish Fork, Utah. In order to stretch the normal 15-day supply of coal on hand as far as it will go, Columbia has cut its coking operations about in half. Consequently schools are being closed because of a lack of heat and office workers are shivering as they go about their tasks in outdoor apparel.

Provo and Utah county officials have approved Columbia's plan to stretch the limited coal supply, but have sent messages to John L. Lewis and William Green in n appeal for enough coal to keep coking operations at full capacity to provide essential heat to the affected communities. It is reported that Utah AFL leaders are in favor of this move.

"If the coal strike lasts in excess of 50 days, we will be forced to close down our coke ovens completely," Columbia officials stated. "This means the ovens will crack while cooling and will have to be entirely rebuilt at a cost of hundreds of thousands of dollars. It would also require approximately a year to rebuild providing supplies are available." If this situation should develop the three communities now supplied with coke oven gas would be without this fuel.

Officials of Kaiser Co., Inc., operators of the only other western blast furnace, report that they have a normal 30-day supply of coal on hand and that coking operations are being reduced to stretch this as far as possible. The 1200-ton daily capacity blast furnace is operating considerably below capacity and only enough pig is being cast to meet the immediate demands of the openhearths, company spokesmen stated. It is reported that normal coal consumption in the 90 ovens at Fontana has run approximately 1500 tons per day.

Bethlehem Pacific Coast Steel Corp. anticipates no interference with its openhearth operations on the Pacific Coast because of the coal strike unless eastern pig sources are affected by a prolonged shortage of coke. West Coast openhearth operations of this company as well as those of Columbia are based on a heavy charge of scrap of which no shortage is apparent according to local buyers.

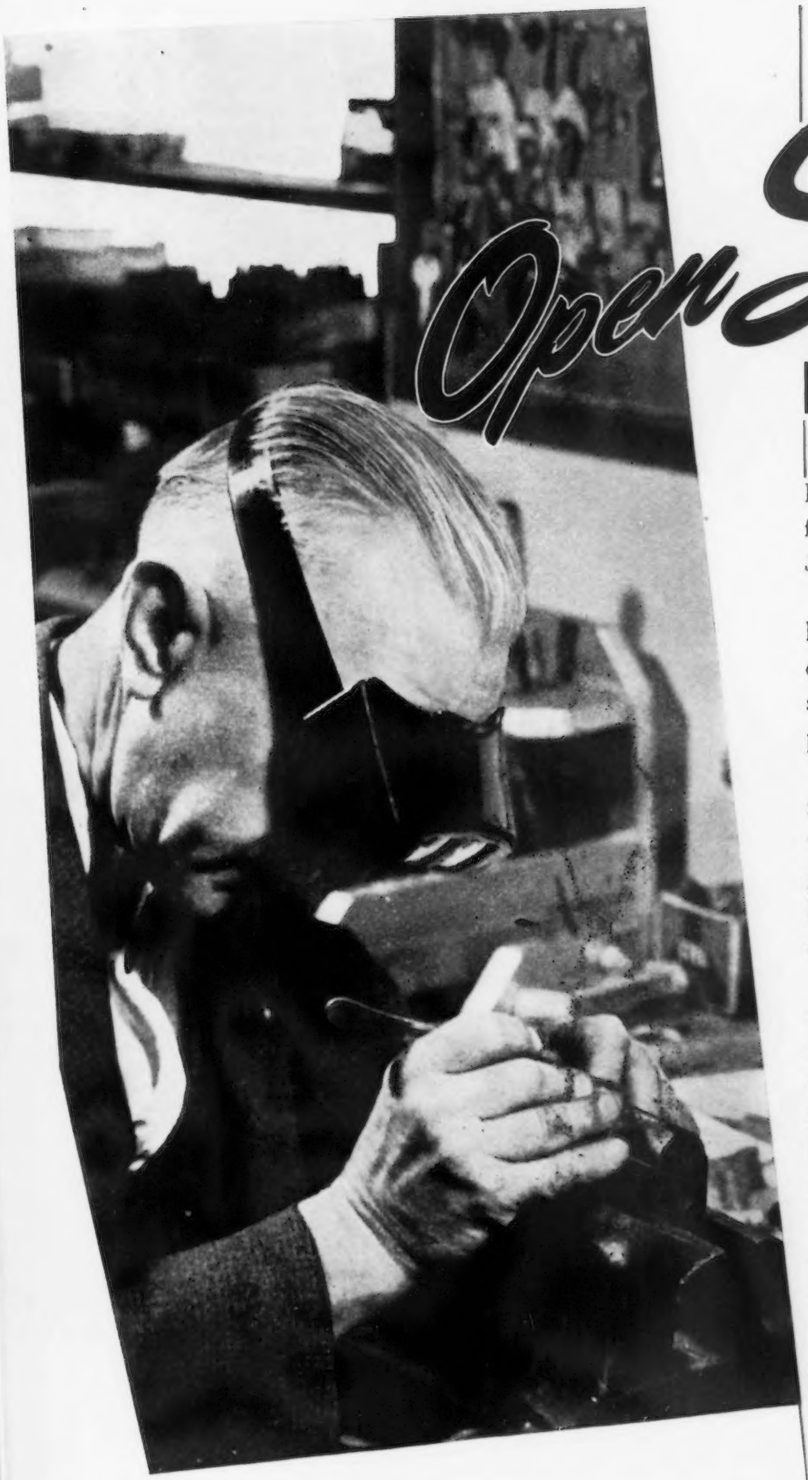
Western steel users are more alarmed over the potentialities of a prolonged coal strike which will affect eastern production of sorely needed sheets and shapes than they are over the possible effects on local producers which seem able to take care of themselves for some time. Production at the Richmond, Calif., Ford Motor Co. plant was stopped last week because of a shortage of parts, W. A. Abbott, plant superintendent, reported, as was the plant at Long Beach. It was expected that both plants would again get rolling the middle of this week. This shutdown suspended completion of 525 cars and trucks at Richmond and at Long Beach 132 cars would have been produced daily according to company officials.

STEEL users this week had a brief holiday of buying in this area as the War Assets Administration placed some thousands of tons of sheets, shapes and plates on the market. Long before the expiration of the 10-day "publicizing" period, orders covering "ten times the quantity available" were received by the WAA according to local officials.

The local tight oil drum situation, which is reported as delaying shipments of oil to China, may soon be relieved if the Myers Barrel Co. of Oakland, Calif., can arrange for shipment of some 400,000 used 55 gal, 16 gage drums from such distant points as the Hawaiian Islands and Alaska to their reconditioning facilities in Oakland and Stockton, Calif. The sale of these drums for approximately $84,000 "as is and where is" was reported by J. M. Barringer, director of the Dept. of the Interior Surplus Property Office.

This company reconditioned approximately 1 million such drums for the U. S. Army during the war, according to Gilbert W. Myers, who stated that demand for such drums is so heavy at this time that it will take more than six months for manufacturers to catch up. Mr. Myers' immediate problem is to find shipping space for these drums and he is now appealing to the Army and Navy for assistance.

Labor troubles continue to harass heavy industry in this area: Columbia Steel Co. is still dicker-



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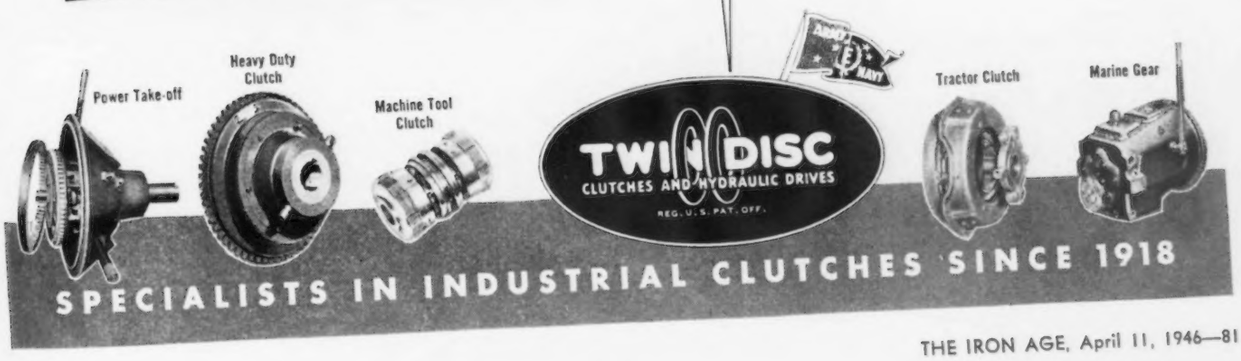


ing with the organized office employees at their Pittsburg and Torrance, Calif., plants on the matter of classification, although the 18½¢ hourly increase, maintenance of membership and other conditions established after the steel strike are in effect. CIO Utility Workers from Santa Rosa, Calif., on the north to San Jose, Calif., on the south are threatening a strike against the Pacific Gas & Electric Co. for Apr. 23 to enforce a demand for a 20 pct wage increase. All industry as well as the ordinary householder in this area, which includes San Francisco and Oakland, would be without gas and electricity if the 3500 utility workers go out. Several shops in the Bay Area employing machinists are still not in operation because of jurisdictional disputes between local unions although the machinists' strike was settled last month. The smelters in San Francisco and Selby, Calif., operated by the American Smelting & Refining Co. are still down as settlement of all issues in the dispute except that of wages has been effected.

Announcement by United Air Lines that this organization would locate its system-wide maintenance and overhaul base at the San Francisco airport is being cited by local government officials as ample justification for the recently approved $20 million improvement program for the field. It is reported by W. A. Patterson, president of United, that the project will involve a payroll of 6000 before the end of 1955 and that the operation will be equivalent to an "extremely large aircraft factory."

The company's fleets of four-engine and twin-engine planes will be brought to San Francisco for periodic overhaul and repair and the expanded operations will require an increase in factory space of from 125,000 sq ft to 500,000 sq ft.

LOS ANGELES—A box score on the strike situation in this area has been released by the Merchants & Manufacturers Assn. which quotes Dept. of Labor figures showing that in March there were 32 strikes of which 22 had been carried over from February. In March 6448 workers were made idle because of these strikes and 81,196 man-days were lost. This loss was 62 pct less than in the previous month. The month of April started off with 6648 persons idle in 11 strikes.

Sixty-five strikes in the first quarter of the year affected 16,328 workers and cost them a wage loss of $4,579,423, according to the report.

The statement identifies the American Federation of Labor as the cause of 15 of the 65 strikes and 1.7 pct of the total wage and man-day losses, and the CIO as the cause of the remainder of the strikes and 98.3 of the total wage and man-day losses.

The statement reported that the number of unemployment claims in Los Angeles, Ventura and Santa Barbara Counties for the week ending March 21 was 1.1 pct lower than the February weekly average.

Reynolds Metals Co. of Richmond, Va., has purchased the business and property of Ogle, Inc., of Los Angeles for $500,000, it has been announced. Reynolds will continue the manufacture of tubular aluminum furniture in the plant for distribution in South America and the Orient, it is stated.

SEATTLE — The question of what is to become of the $21 million DPC plant at Renton and occupied by Boeing during the war is being given new life by the interest shown by Northwest Airlines, Inc. Boeing is expected to vacate the plant about July 1 and Northwest has been reported as interested in the possibility of purchasing the property as headquarters for its transcontinental lines.

Northwest is reported as being confident that the company will receive approval of the Civil Aeronautic Board for a line from Seattle to Tokyo via Alaska and the Renton location with its modern airfield and equipment would make an excellent site for headquarters, it is stated. There has been considerable talk of the plan of the company to invest approximately $10 million in such a setup.

The Navy has been considered the likely occupant of the Renton plant but it is now understood that Whidby Island is favored as its main installation.

CAB is scheduled to pass on Northwest's application sometime within the next six weeks and probably no decision in regard to definite plans will be announced by Northwest until after the application ruling is made public.

Kenworth Motor Truck Corp. is expected to get its first truck off of its new line in the former Fisher Body plant this week. All truck production was halted on Mar. 1 when facilities were moved into the new plant. During the war, Kenworth had expanded in the city, moving into nine separate plants in addition to starting a division in Yakima to take its operations out of the critical labor area. Not all of the units scattered throughout the city are in the new location as yet, but are at least in the process of moving. The Yakima division is expected to be incorporated in the new location by Apr. 15.

All truck, bus and coach building operations of Pacific Car & Foundry Co. and Kenworth Motor Truck Corp. will be consolidated in the new plant according to Paul Piggott, president.

•

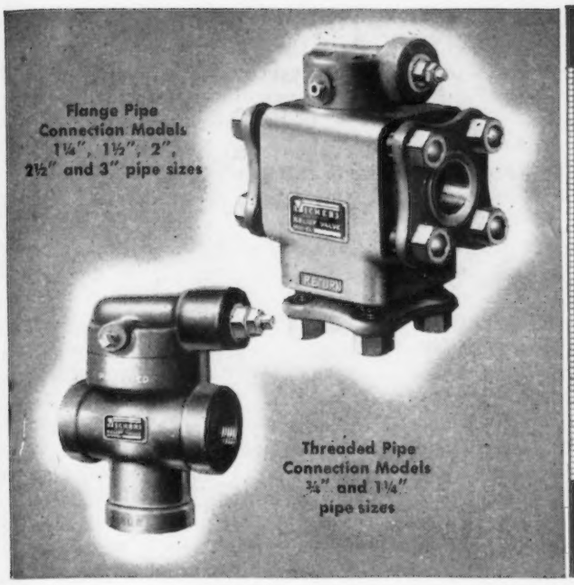
SEATTLE—Officials of Northwest Airlines, Inc., announced the signing of a $15,000,000 contract for the purchase of a fleet of ten Boeing Stratocruisers, the 75 to 105 passenger transport developed from the Boeing B-29. Going into service early in 1947, the double deck airliners, with a cruising speed of 340 mph will make possible 7 hr nonstop service on Northwest's New York to Seattle route. They will also make possible a limited-stop transcontinental service of about 8½ hr.

The new contract increases Boeing's orders for the Stratocruiser to $46,000,000. Pan American Airways were the first to place an order, signing a $25,000,000 contract. Recently the Swedish International Airlines, Sila, ordered four of the ships at a cost of $6,000,000. Boeing is currently negotiating with several other airlines.

While the Boeing sales force was negotiating for new business, the company's industrial relations officials announced they and the workers collective bargaining agency, the Aeronautical Mechanics' Union had agreed upon a new wage scale, granting a weighted 15 pct average for all union employees. The company is drawing up a similar pay scale for its non-union workers.

MORE ACCURATE

HYDRAULIC PRESSURE CONTROL



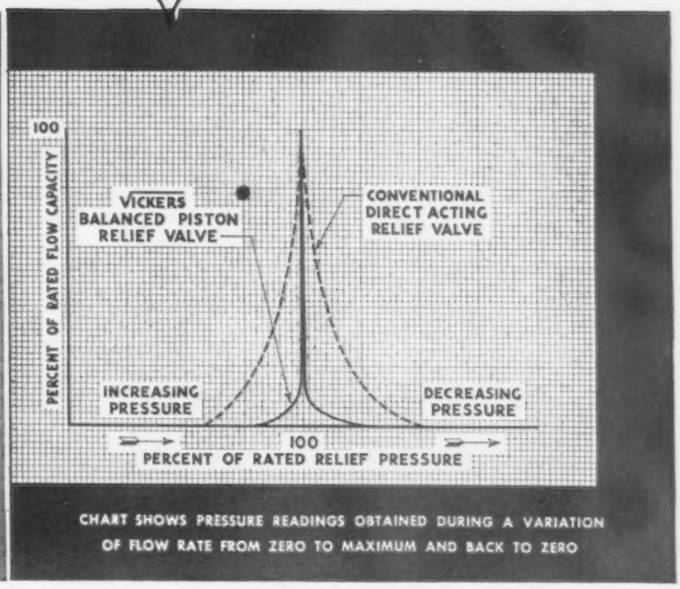


CHART SHOWS PRESSURE READINGS OBTAINED DURING A VARIATION OF FLOW RATE FROM ZERO TO MAXIMUM AND BACK TO ZERO

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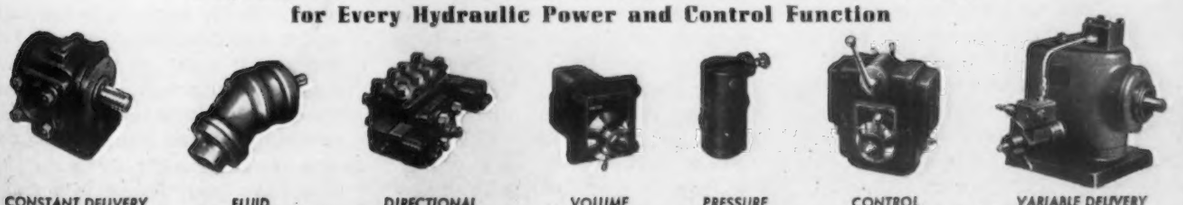

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European Letter . . .

JACK R. HIGHT

• Ruhr steel operation details secret . . . France demands German blast furnaces be closed . . . Diplomats have crack at European economy.

BERLIN—With the concentration of about 60 pct of Germany's prewar steelmaking capacity in the British zone of occupation, one of my greatest interests for some weeks has been the policy guiding present production in the Ruhr. The basic controlling factor in all European steel output today is the allocation of fuel supplies, and almost everyone could materially increase their tonnage were more metallurgical coal sent their way by the European Coal Organization.

Planning this trip to Germany, I was informed in London that all the detailed statistics on production, present capacity and future planning for the Ruhr mills were available here in Berlin where policy decisions are presently being made for the occupation period and after. Due to the public pressure that France has been applying to change the character of coal allocations, I have been extremely anxious to get a first hand description of what mills are in operation in the British zone at present.

French allegations are that for one reason or another British authorities have chosen to make coal from the Ruhr available to the German mills, so that many of them have been able to start operations. At the same time French reconstruction is being limited by a lack of the coal that has traditionally been imported from the Ruhr and from Great Britain. Stories from British and French sources have frequently conflicted as to the exact amount of activity in German blast furnace and steelmaking plants.

To clarify the issues involved, I have hoped for some time to be able to state here in some letter: these are the mills in operation; certain segments of the shops are idle, while other departments are operating at x pct of their present capacity and at y pct of their prewar capacity.

In my most optimistic manner I started out to gather such information while in Berlin in January. I felt sure that the French were exaggerating existing conditions or at least the motives behind them, and that the British were certainly much more anxious to get French reconstruction under way than to see activity in German mills. It seemed likely to me that the British control authorities for Germany would be able to demonstrate with a few statistics and some elaboration of the facts exactly what the existing situation is, and why present procedures are being followed.

Upon arrival in Berlin I discovered a series of reports issued by the American authorities for the American zone, covering all phases of industrial activity. This same type of report covering the British zone should be a good foundation for a story that would either kill the accusations cast up by embittered French authorities, or corroborate them. I cheerfully set out to obtain a copy of such a British report.

Following channels in an admirable fashion I requested an interview with an appropriate British military government official from the proper public relations officer during my previous visit. Due to the absence of a section chief, and various other less interesting excuses, the interview never materialized while I was here.

Filled on this current visit with more determination and less patience, I again obtruded myself on the presence of the public relations officer. Outlining my needs in the humblest of terms, I again petitioned his assistance. Using the freedom of the press as a mighty bludgeon, he arranged an interview for me to take place the same afternoon. He helpfully offered to solve the inevitable problem of directing the German jeep driver to a strange address by taking me there himself.

CALLING at the appointed hour that afternoon, I discovered that once again the deal was off. I assumed the air of an injured martyr, while he explained that he was "drawing up his heavy artillery" and intended to get me an interview if he had to resort to violence. He must have meant it, as in the course of time the interview did develop, due entirely to his valiant efforts.

The British, it seems, do not issue any such report as do the American authorities and implied in answer to my request that detailed information as to the exact status of production is unavailable. Steel production in their zone for December amounted to 107,000 metric ingot tons, and increased to 137,000 in January. They are making an effort to increase this amount to 150,000 metric tons per month in the future.

Pig iron production is running slightly above this figure, at about 160,000 metric tons. These figures represent roughly 10 pct of existing capacity in the British zone. Most of the output is going under high priority to railways and coal mines, while housing, which is third on the priority list, has been unable to get any substantial tonnages.

Extreme reluctance is shown to give any precise information to the public about exactly how many facilities are in operation or exactly what they are doing. The most important fact, of course, is that none of them are doing very much, as the above production totals would indicate. But any breakdown of the above is impossible to obtain. I was assured that this reluctance is due to future reparations policies yet to be established.

About half a dozen plants were mentioned by name as being active, and it was cautiously indicated that about that many more are in some stage of production. In most cases, it seems likely that local stocks of raw material and semifinished products are being used up in the shops that have been found intact as in the case of most other industries,

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Spark plugs with electrodes that grow with use instead of wearing away are a recent contribution of the electrical engineering department of Yale University.

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Alcoa's Cleveland Works test aluminum castings to destruction by centrifugal force in an armored pit. Parts are turned up to 25,000 r.p.m. in a partial vacuum.

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The National Bureau of Standards sees the end of the octane system of evaluating motor fuel and suggests a leaded triptane-neptane scale to be known as a "detonation index".

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Baldwin Locomotive Works have completed a locomotive for the Seaboard Railway that uses two 1,500-horsepower diesel engines with electric drive in a single unit instead of the usual two or more coupled units.

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By comparing the magnetism produced in a sample with standard specimens of known hardness, the new magnetic hardness tester made by General Electric tests parts too small for mechanical hardness gages.

Nitric oxide can now be made by an efficient, simple and inexpensive method developed in the chemical laboratories of the University of Wisconsin.

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Said to be the hardest in the world are the new vitrified bonded diamond wheels made by Norton Company.

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A new kind of small, powerful magnet is made by General Electric of iron and cobalt oxides and is not itself a conductor of electricity.

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Ford's new foundry method is to bring the molds to the molten metal.

Pyrene is equipping diesel-electric locomotives with carbon dioxide extinguishers that will detect and put out fires inside or underneath them.

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Jack and Heintz state that their new Skinner gasoline engine will be the first die-cast engine ever produced.

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The new small tractor that Allis-Chalmers is expected to introduce will push its tools instead of pulling them. Price is expected to be under $400.

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American Gas & Electric Service Corp. announces plans to set up a 500,000-volt transmission line in Ohio to experiment with the sending of ultra-high voltages.

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27

these stocks are about exhausted, according to British officials.

There were some reserves of high-grade iron ore found in the British zone, but if the occupying authorities bothered to determine how much, they refused to disclose the figure. They are willing to state that most of it is probably consumed by now. To date there has been no domestic iron ore production in the British zone, but it should get under way on a limited scale this month.

Production in general will probably drop off sharply in the British zone in all lines as a result of the drastic reduction in the food rationing which was implemented on Mar. 4. The ration now stands at 1000 calories a day, which all nutrition experts agree will not sustain a working population for more than a few weeks at most. Generally it is considered a bare subsistence for nonworkers. The double effect that this will have, due to a drop in coal as well as steel production, may virtually wipe out reconstruction efforts being carried forward by the Germans.

Officials here estimate that the food situation will remain crucial until July 1, when the first harvests come in, but will remain serious until Oct.

THE fundamental program for the future standard of living in Germany, which is expected by reporters momentarily as I write this, assumes less importance as one realizes that the entire economic discussions are again being hashed over by the Four Powers on the diplomatic level in London. The discussions taking place there have in view the French proposal of partitioning Germany still further and internationalizing the Ruhr.

The level of industry report to be released here is based entirely upon the assumption that postwar Germany is to be operated as an economic unit and therefore would be subject to revision if the Ruhr is split away. In a recent press conference here Gen. Lucius Clay, Deputy Military Governor for the American zone, injected a new idea that might possibly be a tipoff as to the direction the horsetrading in London is taking.

He emphasized in answer to a direct question that there was the possibility that the Ruhr could be divided politically, but still operate economically as a part of Germany. It would appear that if any such fantastic device is announced it will be only balm for the pride of France.

France's original intention in demanding the separation of the Rhineland and internationalization of the Ruhr was to establish firm economic controls thereby and permanently limit the German war-making potential. Having taken such a firm stand at first in private and later in the world's press, France may now well feel itself in a position where it dare not back down for reasons of international prestige. Only under such circumstances would there appear to be any justification for deciding to operate the Ruhr as General Clay suggested.

•

British Map Nationalization

London

• • • **In the House** of Commons on Mar. 18, the British Prime Minister, on being asked when he proposed to introduce a bill to nationalize the iron and steel industries and the railways respectively, replied that a bill to provide for the nationalization and better coordination of transport would be introduced at an early session of this Parliament.

He went on to say that, while he appreciated very much the enthusiasm of the member of Parliament who had asked the question, he advocated patience in awaiting a statement of policy regarding the iron and steel industries.

•

New Runways for Airfield

London

• • • **Lord Winster**, British Minister of Civil Aviation, has announced that Heathrow Airport, which will in future be known as London Airport, is to have six runways in three parallel pairs arranged around a central terminal building, and will be capable of handling 160 aircraft movements an hour in good weather and 120 in bad weather.

The first three runways will be completed by July, and the airport will then be scheduled for interna-

(CONTINUED ON PAGE 110)

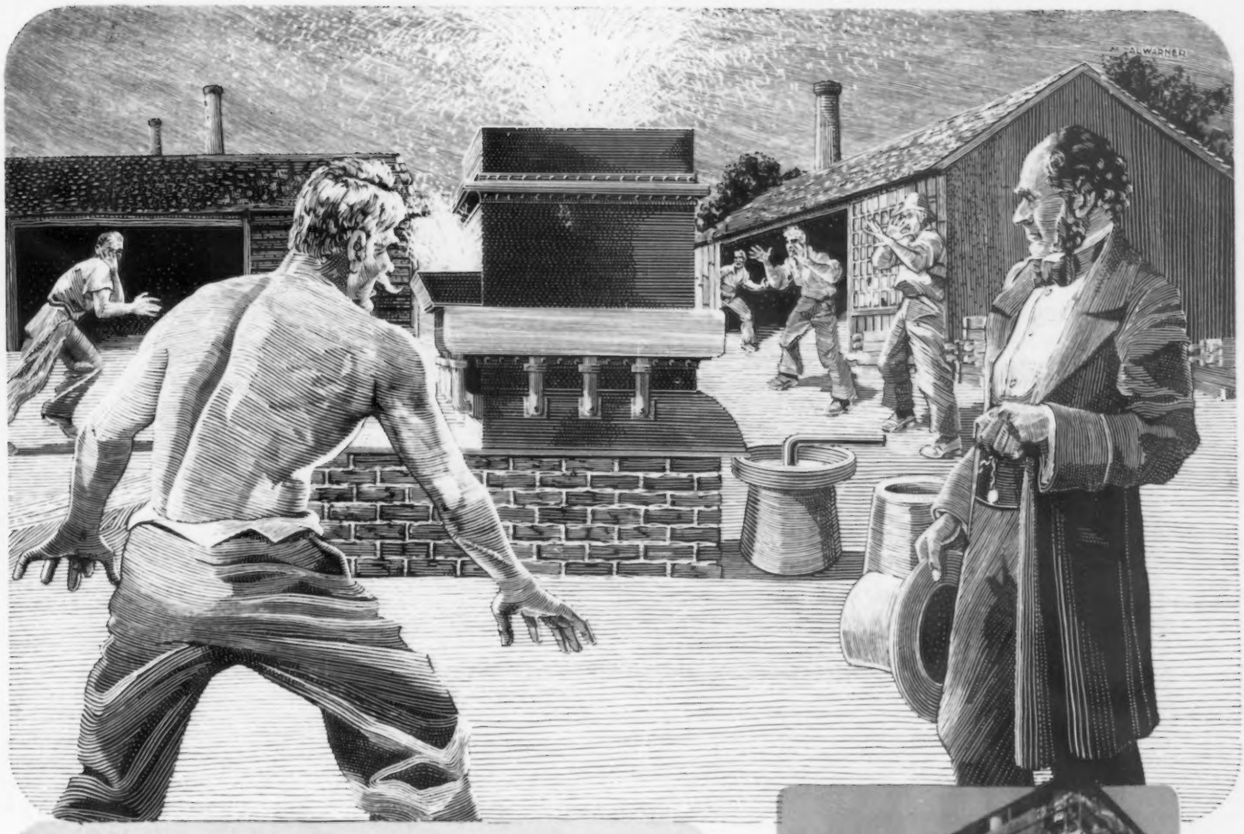
London

• • • The February housing figures for England and Wales show that 4264 houses were completed during the month. Of these 735 were permanent and 3529 temporary.

The total under construction at the end of February was 15,323 which includes 14,432 permanent (including 8000 estimated under construction by private enterprise) and 891 temporary.

Detailed figures for January and February are given in the following table:

	Up to Jan. 31	February	Total to Feb. 28
Houses Completed			
Permanent houses on new sites:			
Local authorities	352	93	445
Private enterprise	1,116	484	1,600
Destroyed houses rebuilt (all sources)	441	158	599
Total	1,909	735	2,644
Temporary houses	12,025	3,529	15,554
Total completed	13,934	4,264	18,198
Under Construction			
Permanent houses:			
Local authorities	16,765	6,090	.....
Private enterprise (estimated)	5,000	8,000	.....
Destroyed houses rebuilt (all sources)	2,726	342	.....
Total	24,491	14,432	.....
Temporary houses	13,600	891	.....
Total under construction (excluding those completed)	38,091	15,323	.....



APOSTLE OF PRODUCTION

Steel has been made for many centuries prior to Henry Bessemer's work, but processes were painfully slow and prices prohibitively high. As a result, the steel industry was small and employed but few people.

When the Bessemer Converter reduced steel making time from six weeks to less than one hour, steel became available for the most commonplace use. Thus production's fundamental law was demonstrated . . . that speed in manufacture gives lower cost and therefore greater product use.

This law is still fundamentally sound and Clearing Presses provide another good demonstration. In hundreds of plants today, Clearing Presses are helping to provide finished products faster with greater accuracy and at lower cost. You are invited to consult with Clearing engineers at any time, whether your problem be faster production to decrease unit cost or new methods to improve quality or appearance.

Clearing presses are good examples of modern machines that help to produce more and better metal parts at lower cost than ever before.

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This 700-ton capacity Clearing Hydraulic Press will soon be on a production line helping to fill America's need for peacetime products. Typical of Clearing's service, the design of this press began with a complete analysis of the user's production requirements in terms of parts to be made and volume desired. This Press has a maximum stroke of 48", shut height of 76", bed area 60" x 144", and capacity of 700 tons. Write for Clearing Press information and recommendations based on your production needs.

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PERSONALS

JOHN G. PATTERSON, II, secretary and general attorney, Pittsburgh Limestone Corp.

• **John G. Patterson, II,** has been appointed secretary and general attorney of Pittsburgh Limestone Corp., U. S. Steel subsidiary. Mr. Patterson joined the legal staff of Carnegie-Illinois Steel Corp. in 1935, and was appointed assistant secretary and attorney of the company in 1938, holding that position until the present time.

• **A. A. Gustafson** has been appointed sales engineer for the Ajax Electric Co. of Philadelphia. He will maintain offices at St. Paul, from which he will cover Minnesota, North and South Dakota and northern Wisconsin. He was formerly connected with E. F. Houghton & Co.

• **Clifford C. Thompson** has been appointed credit manager for the Columbia Chemical Div. of the Pittsburgh Plate Glass Co., Pittsburgh. He has been associated with the company for the last 10 yr, and during the past 3 yr served as a traveling representative of the treasurer for the company.

• **P. E. Francis,** formerly vice-president, North Western-Hanna Fuel Co., St. Paul, Minn., and **W. B. Poindexter,** formerly general sales manager, Pittsburgh Coal Co., Pittsburgh, have been appointed vice-presidents of the Lake Coal Div. of Hanna Coal & Ore Corp.

• **John F. Seifried** has been named Chicago district manager for Ceco Steel Products Corp.

• **C. Rider Brandau,** associated with the sales dept. of Lukens Steel Co., Coatesville, Pa., since 1924, has been named manager of sales of Lukens and its subsidiaries, By-Products Steel Corp. and Lukenweld, Inc., for the Baltimore district, succeeding **Adolph Rider, Jr.,** resigned.

• **Dr. F. R. Hensel** has been elected vice-president in charge of engineering of P. R. Mallory & Co., Inc., Indianapolis. He has been chief metallurgical engineer for the Mallory company since 1934.

• **Richard W. Meacham** has been appointed the Yale sales representative for the Alabama-Louisiana-Mississippi territory of the Stamford, Conn. Div. of Yale & Towne Mfg. Co., succeeding V. A. Waldron.

• **Melvin C. Wilt,** formerly executive vice-president and general manager of Curtis Lighting, Inc., Chicago, has been elected president of the company. Mr. Wilt replaces **Darwin Curtis** who becomes chairman of the board of directors. **Kenneth Curtis,** formerly chairman of the board, becomes chairman of the advisory committee.

• **P. P. Wojtul,** formerly assistant to the vice-president and comptroller, Continental Can Co., New York, has been appointed assistant to Hans A. Eggcss, executive vice-president. Mr. Wojtul has been with the company for 19 yr. **H. A. Swertfeger,** who was chief industrial accountant, succeeds Mr. Wojtul as assistant to the vice-president and comptroller. **W. W. Hodgson,** chief industrial engineer of Continental Can and associated with the company for 22 yr, has retired, and **L. C. Walgash,** Mr. Hodgson's assistant, succeeds him.

• **H. S. Hoyt, Jr.** has been assigned to cover the Boston territory of A. Milne & Co., formerly taken care of by **Andrews W. Clark,** and Mr. Clark has been appointed manager of the Hartford office, replacing **C. C. Pinkney** who has been transferred to the New York office.

HENRY A. STIX, executive vice-president in charge of operations, Federal Machine & Welder Co.

• **Henry A. Stix** has been elected executive vice-president in charge of operations of Federal Machine & Welder Co., Warren, Ohio, and its subsidiaries, Warren City Mfg. Co., and Sommer & Adams Co. Mr. Stix was formerly treasurer of Federal Machine & Welder Co.

• **P. A. Alers** has been appointed manager of the El Paso, Tex. office of Worthington Pump & Machinery Corp. He has been connected with the company since 1933. **Andrew S. Ormsby,** formerly in charge of industrial relations of the Bendix Aviation Co., has been appointed director of industrial relations for Worthington.

• **C. L. Miller** has been appointed purchasing agent of the American Welding & Mfg. Co., Warren, Ohio.

• **Norman A. Matthews** has been appointed works metallurgist of Electro-Alloys Div. of the American Brake Shoe Co., New York. He was associated with the National Tube Co. and later the U. S. Steel Corp.

• **James A. Aborn** has been elected chairman of the board of Laminated Shim Co., Glenbrook, Conn. **E. B. Nisbet** has been named president, **A. V. Anderson,** executive vice-president and treasurer, and **H. B. Swindells** has been made purchasing agent.

• **J. Eugene Eagle** has joined the Pemco Corp. sales staff, Baltimore. For the last 3 yr he has been associated with the WPB as chief of the non-metal section.

• **Oscar W. Nelson** has been named vice-president and general manager of the Peoria, Ill. plant of R. G. LeTourneau, Inc. He was formerly general manager of the Beaver, Pa. plant, Propeller Div., Curtiss Wright Corp. He will have responsibility over all Peoria operations, his duties including those formerly handled by **Denn M. Burgess,** who recently resigned as executive vice-president and director.

• **W. R. Harrison,** president since 1941 of the Spun Steel Corp., Canton, Ohio, and with the company at its founding in 1926, has resigned to enter a new manufacturing enterprise. **Curtis Franklin,** treasurer of Automatic Products Co., New York, which purchased Spun Steel in 1937, has been elected the new president. **John Carnahan** has been named vice-president in charge of sales; **W. G. Kilpatrick,** vice-president in charge of engineering; **Paul Williams,** vice-president in charge of production; and **Arthur Sowers,** treasurer.

• **Walter F. Myers** has been appointed assistant district manager of the Cooper-Bessemer Corp.'s Washington office to succeed **T. E. Kraner,** recently appointed manager of the company's Venezuela branch. **Laurence B. Hume** has been made sales engineer and service supervisor for the territory covered by the Washington district office. Mr. Myers joined Cooper-Bessemer as a member of the Washington staff in January 1945. Mr. Hume recently returned from 2 yr of service in the Pacific area as a U. S. Navy technician for Cooper-Bessemer equipment.

• **B. F. McMahon,** manager of sales, Tin Plate Div., Bethlehem Steel Co., Bethlehem, Pa., has retired having been connected with the steel sheet and tin plate industry for the past 39 yr. He joined Bethlehem Steel in 1917. During the war he served as a member of the WPB's tin plate committee of the Steel Div. **William J. Stephens** has been promoted to the position of manager of sales, tin mill products. He has been with the company since 1922 and has been with the Tin Plate Sales Div. since 1940.

ALBERT J. HULSE, chief engineer, Youngstown Sheet & Tube Co.

• **Albert J. Hulse** has joined the Youngstown Sheet & Tube Co., Youngstown, Ohio, as chief engineer. Formerly with Carnegie-Illinois Steel Corp. at Pittsburgh, he succeeds J. D. Jones, who left Youngstown Sheet & Tube Co. about a year ago. Mr. Hulse, transferred by U. S. Steel Corp. to Columbia Steel Co. to serve as chief engineer on the construction of Geneva Steel Works for the U. S. Government, returned to Carnegie-Illinois as senior staff engineer in the Pittsburgh office.

• **Donald Dunwody** has been appointed assistant branch manager of the New York sales district of Monsanto Chemical Co.'s Phosphate Div. He was in the sales dept. of the Swann Chemical Co. until its acquisition by Monsanto in 1935, and since then has been a resident salesman in New York. From 1942 until 1946 he was on leave with the U. S. Navy.

• **R. J. Wean, Jr.** has returned from the armed forces and has taken the position of vice-president, Wean Engineering Co., Inc., Warren, Ohio. He also has been elected assistant to the president of Broden Construction Co., Cleveland, a subsidiary of Wean Engineering. **N. J. Ranney,** formerly assistant to the chief engineer of Wean Engineering Co., has returned after service in the U. S. Navy and has been appointed chief engineer of the Broden Construction Co.

• **Harry Bottomley** has been appointed sales representative in the southern Pennsylvania and Virginia territory for Wickwire Spencer Steel, New York. He replaces **H. C. Stults,** resigned. Mr. Bottomley was employed in the hardware products dept. before his induction in the Army.

• **Frank A. Schwerdt** has been elected treasurer of Victor Chemical Works, Chicago, succeeding **G. W. Christopher,** retired. Mr. Schwerdt is succeeded as assistant secretary and head of the accounting dept. by **Tolman G. Everett,** for the last 19 yr head of the cost dept.

• **Jones Y. Pharr, Jr.** has been designated southern representative for New Departure Ball Bearings, a division of General Motors Corp., Bristol, Conn., with his headquarters in Charlotte, S. C.

• **Walter F. Green** has been promoted to assistant manager of the Timken Roller Bearing Co.'s Div. of Research & Development, Canton, Ohio, while **Joseph M. Roshong** has been named superintendent of the division. **Harley J. Urbach** has been appointed works engineer, taking over the former duties of Mr. Green. **F. R. MacFadyen** has been transferred from the Milwaukee office to the Canton engineering dept. of Timken as industrial engineer.

• **Kenneth A. Moody** has been appointed to the newly created position of training director of American Steel & Wire Co., Cleveland. Mr. Moody was identified with personnel and training education in the company from 1937 until his departure for military service in December 1943.

• **H. J. Gearhart** has been elected executive vice-president of Pressed Steel Car Co., Inc., Pittsburgh. All retiring directors were re-elected. Mr. Gearhart was formerly vice-president, secretary and treasurer, and succeeds George H. Fleming as executive vice-president. **C. P. Mapp, H. E. Chilcoat** and **G. J. Lindroth** have been elected vice-presidents. **B. W. Harvey** has been named secretary and **F. D. Evans,** treasurer. **L. J. Lieberthal** was appointed assistant to the president; **S. C. Borland,** assistant secretary; and **C. E. Waldron,** assistant treasurer.

• **Ward M. Canaday,** chairman of the finance committee of Willys-Overland Motors, Inc., has been elected president of the Cleveland Post of the Army Ordnance Assn. **C. F. Hood,** president of American Steel & Wire Co., is the retiring president of the Cleveland Post.

• **C. B. Parsons,** former superintendent of the Dayton Tool & Engineering Co., will be in charge of the newly opened Milwaukee office of the Michigan Tool Co.

• **Gil A. Churchill** has been appointed manager of the Chicago office of the Perfex Corp., Milwaukee, and **B. F. Werb** will take charge of the newly opened Milwaukee sales office.

• **C. C. Hermann** has been appointed special representative for the sale of Whiting Corp.'s Hydro-Clone line of dust collector and spark suppressor equipment in the states of Indiana, Michigan, Ohio, Western New York and Eastern Pennsylvania. He will make his headquarters at Grosse Pointe Park, Mich.

• **J. Russell Garrison,** identified with the Worcester, Mass. plant of the Washburn Co. since 1922, has been made a director. He also becomes treasurer to succeed **Nelson Hood,** resigned. **Robert G. Hess,** with the company since 1923 and manager of the Worcester plant, has been appointed director and vice-president, as has **Harold E. L. Green,** former manager of the company's Rockford, Ill. subsidiary. **Harold R. Newell,** who joined the Canadian subsidiary, the Andrews Wire Works of Canada, Ltd., and is president, manager, treasurer and director of that company, has been made a director of the parent company.

• **J. T. Little,** district manager of F. W. Dodge Corp. at Philadelphia, has been elected regional vice-president for the eastern states. **Ralph M. Hairston,** executive assistant to the vice-president in charge of the Construction News Div., has been elected regional vice-president for the southern states; **Cyrus G. Fanning,** for the middle west; and **Carl S. Bennett,** for the western states. Both Mr. Fanning and Mr. Bennett have been affiliated with the Dodge organization for over 25 yr.

• **Frederick J. Mayo, Albert P. Durso, Murray E. Johnson** and **Donald W. Neville** have been elected vice-presidents of F. H. McGraw & Co., Hartford, Conn. Mr. Mayo, vice-president and general representative of the Continental Industrial Development Co., a subsidiary of F. H. McGraw & Co., will be in charge of the New York and New England districts. Mr. Durso, who has been Pittsburgh manager for McGraw, will be in charge of the Pittsburgh district. Mr. Johnson, manager of the Gary, Ind. branch, will be in charge of the entire Gary-Chicago district, and Mr. Neville, formerly manager of the Provo, Utah office, will be in charge of the western district.

• **J. A. Strachan** has been made sales manager of the Original Equipment Div. of the Weatherhead Co., Cleveland. **D. W. Holmes** has been appointed sales manager of the Standard Parts Div.; **T. V. Scott,** sales manager of the Liquefied Petroleum Products Div.; and **L. C. Doolittle** heads up the Aviation Div. as sales manager.

• **Richard B. Price** has been appointed superintendent of the Atlas Works of the Socony-Vacuum Oil Co. at Buffalo, succeeding **Rutherford T. Lockwood,** who has retired. **Herbert P. Shepard,** chief engineer, has been named assistant superintendent, filling the vacancy created by the promotion of Mr. Price.

• **Walter E. Lucie,** formerly controller, assistant secretary and assistant treasurer of Kaiser Cargo, Inc., Bristol, N. J., has joined Kellett Aircraft Corp., Upper Darby, Pa., as executive assistant to R. G. Kellett, executive vice-president and treasurer.

• **Daniel R. Seagrave** has been appointed superintendent of service and erection in the Seattle district of the Allis-Chalmers Mfg. Co., Milwaukee, succeeding the late **R. C. Norman.** Mr. Seagrave has been with Allis-Chalmers since 1911.

• **F. D. Van Norman** has been made chairman of the Van Norman Co. board, Springfield, Mass., to succeed his brother who died Feb. 28. **R. W. Porter,** treasurer since 1944, has been made a director. **James Y. Scott** is president.

• **S. A. Cogsdill,** founder of the Cogsdill Twist Drill Co., Detroit, over 30 yr ago, has been elected chairman of the board, and **Floyd Cogsdill,** who has been associated with the company many years in both the Mfg. and Sales Divs., has been elected president. **C. B. Stoerkel** has been advanced from division sales manager to sales manager.

• **Walter K. Farst** has been appointed general manager of the Pittsburgh Plate Glass Co.'s cement plant located at Zanesville, Ohio. He succeeds the late Arthur R. Haley. Associated with the glass company's Columbia Chemical Div. for 23 yr, Mr. Farst has been chief engineer in chemical plants operated by the division for the past 5 yr.

OBITUARY...

• **Lee A. Daines,** 52, vice-president and general sales manager of Heppenstall Co., Pittsburgh and Bridgeport, Conn., died Mar. 29 in Miami, Fla. He joined Heppenstall Co. in 1923 and had been a director of the company for 8 yr.

• **Alfred E. Jones,** consultant and service engineer of the general railway dept., Crucible Steel Co. of America, New York, died Mar. 24 at Albany. Mr. Jones was associated with Crucible for 43 yr.

• **C. Emil Nelson,** 70, vice-president and traffic manager of the Crescent Tool Co., Jamestown, N. Y., died Mar. 25.

• **William A. Rogers,** retired Buffalo industrialist and one of the organizers of the American Iron & Steel Institute, New York, died Apr. 7.

• **Mackey Wells,** 60, who for 30 yr was president and general manager of the Kerner Incinerator Co., Milwaukee, died Mar. 22 after a long illness.

• **Maurice D. Langhorne,** 67, general superintendent of E. J. Lavino & Co., Philadelphia, died in Lynchburg, Va., on Mar. 20. He was with the Lavino company 27 yr, in charge of blast furnaces.

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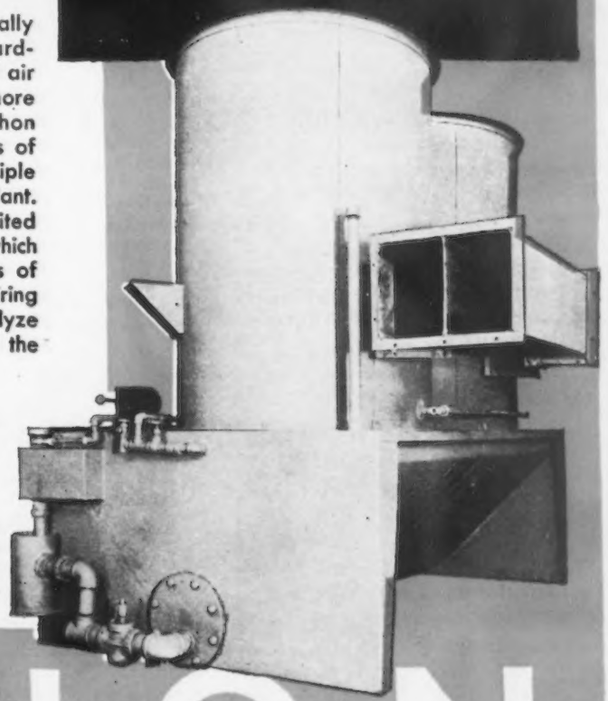

Address Correspondence to INDUSTRIAL EQUIPMENT DIVISION

THE R. C. MAHON COMPANY

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Engineers and Manufacturers of Dust Collecting Systems, Complete Finishing Systems including: Metal Cleaning Machines, Rust Proofing Machines, Dry-off Ovens, Hydro-Filter Spray Booths, Filtered Air Supply Units, Drying and Baking Ovens. Also Annealing Ovens and Core Ovens, and many other Units of Special Production Equipment.

MAHON

Dear Editor:

HOT EXTRUSION OF TUBING

Sir:

Did you publish in the past an article describing the manufacture of steel tubing by hot extrusion, as practiced in a German tube mill? Any help you can give us will be appreciated.

G. M. BUTLER
Associate Director of Research
Tool & Die Steel Div.,
Allegheny Ludlum Steel Corp.,
Brackenridge, Pa.

● Some years ago we published a short item on hot extrusion in a German tube mill, but this article dealt primarily with the commercial rather than the technical aspects of such an operation. We are currently translating considerable new information on German extrusion practice which will shortly appear in THE IRON AGE and may possibly give you the information you desire. You no doubt know that one large concern in this country is already extruding high-temperature alloys.—Ed.

JOB EVALUATION

Sir:

The January issues of your publication carried a most interesting article called "Common Sense in Job Evaluation" and it attracted most favorable attention from various members of our staff. Will you be kind enough to provide us with 12 reprint copies.

J. R. VANCE
Nonferrous Castings Div.
Briggs Mfg. Co.,
Cleveland 8

Sir:

We would appreciate receiving reprints of a series of articles entitled "Common Sense in Job Evaluation" by David Anderson and Arthur H. Hansen.

E. W. STAHL
National Malleable & Steel Castings Co.,
Chicago 50

● Reprints of "Common Sense in Job Evaluation" which also include three previous articles that appeared in THE IRON AGE by the same authors and on the same subject are being forwarded to you. Cost is 60¢ per copy.—Ed.

PRESSURE CASTINGS

Sir:

Please furnish us with the names of manufacturers of beryllium copper pressure castings.

ROBERT P. FRICK
Engineer
Metal Specialty Co.,
Cincinnati

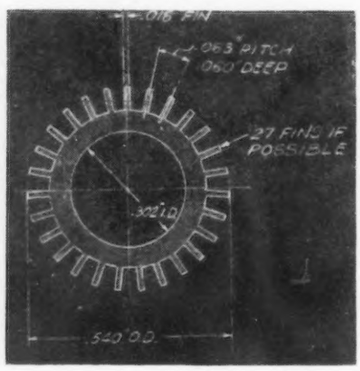
● Sources for the castings include: Ampco Metal, Inc., Milwaukee; Beryllium Corp., Reading, Pa.; Commerce Pattern Foundry & Machine Co., Detroit; P. R. Mallory & Co., Inc., Indianapolis; and Whip-Mix Corp., Inc., Louisville.—Ed.

HEAT TRANSFER TUBE

Sir:

I am attempting to find a source for a special heat transfer tube of the type shown in the accompanying sketch. I have already contacted several tube companies but they tell me their process is not suitable for a tube this small. I have also contacted a seamless tube plant who had done some experimenting in extruding this shape but have also given it up. We prefer steel pipe but would accept tubing made from everdur or cupronickel as an alternative. . . . There is potentially a large market for this surface if some firm would produce it.

R. H. ARMSTRONG
Manufacturing Engineer
Carrier Corp.,
Syracuse, N. Y.



● It may be carrying coals to Newcastle, but have you tried Rome Turney Radiator Co., Rome, N. Y., producers of helical finned tubing in 90 sizes. From the extrusion viewpoint, have you contacted Kroyden Co., Maplewood, N. J., or Cliffdale Mfg. Co., Boston? Perhaps some of our readers could recommend a source for the tube illustrated above. The average tube length is 8 ft, with 250,000 ft per yr the requirement. The material is the same as standard ¼ in. extra strong steel pipe, with no finish required. —Ed.

SCRAP IRON PRICES

Sir:

Could you tell us how prices for scrap iron compare in Mexico with prices in Texas, Birmingham and Pittsburgh? For instance, heavy melting steel scrap. Also billets and rerolling billets.

A. J. HOFMANN
A. Jay Hofmann
Narberth, Pa.

● Sorry, we do not have any editorial representative in Mexico that would permit us to develop this information. It is quite likely that you may be able to obtain Mexican prices from the Institute of Scrap Iron & Steel, whose office is at 1120 Connecticut Ave., NW, Washington 6.—Ed.

BUSHINGS AND BEARINGS

Sir:

We have been offered some new business, namely the manufacturing of bronze alloy bushings and bearings used in the production of and for replacement in electric motors. The dimensions run from ¼ in. I.D. to over 1½ in. I.D. and from ⅜ in. O.D. to 2½ in. O.D. with the length of the parts from ½ in. to several inches long.

Since our experience does not include the making of these parts in the large quantities required, we would like to know the best method of machining the groove, i.e. a fixture on a milling machine, turret lathe or a press or a special machine for grooving. The quantities would run into several hundred thousand a year, and any information you could send us would be appreciated.

JOSEPH F. O'HARA
O'Hara Bros. Machine Co.,
Philadelphia 42

● The job could be done on a milling machine if a small lot were involved, but for the quantities you have in mind, an oil grooving machine would be the most enonomical method. Such machines are produced by the Wicaco Machine Corp., 4806 Stenton Ave., and the Fischer Machine Co., 308 N. 11th St., both of Philadelphia.—Ed.

NICKEL AND IRON ALLOY

Sir:

. . . On p. 41 of the Feb. 28 issue reference is made to a new alloy of nickel and iron for use as lead wires in glass-to-metal seals. Can you please furnish us with the name of the company that developed this.

R. E. SWANSON
Sylvania Electric Products Inc.,
Emporium, Pa.

● The material is an alloy of nickel and iron developed by Driver Harris Co., Harrison, N. J.—Ed.

PRECISION CASTING EQUIPMENT

Sir:

Could you please send me the address of any concern manufacturing equipment for precision casting?

FRED M. OTT
95 Madison Ave.,
Hartford

● An extensive listing of sources of equipment for producing precision castings was given in the article "Equipment and Material for Precision Casting," THE IRON AGE, Nov. 9 and 16, 1944. A copy is being sent you.—Ed.

CARBURSINTERING POWDERS

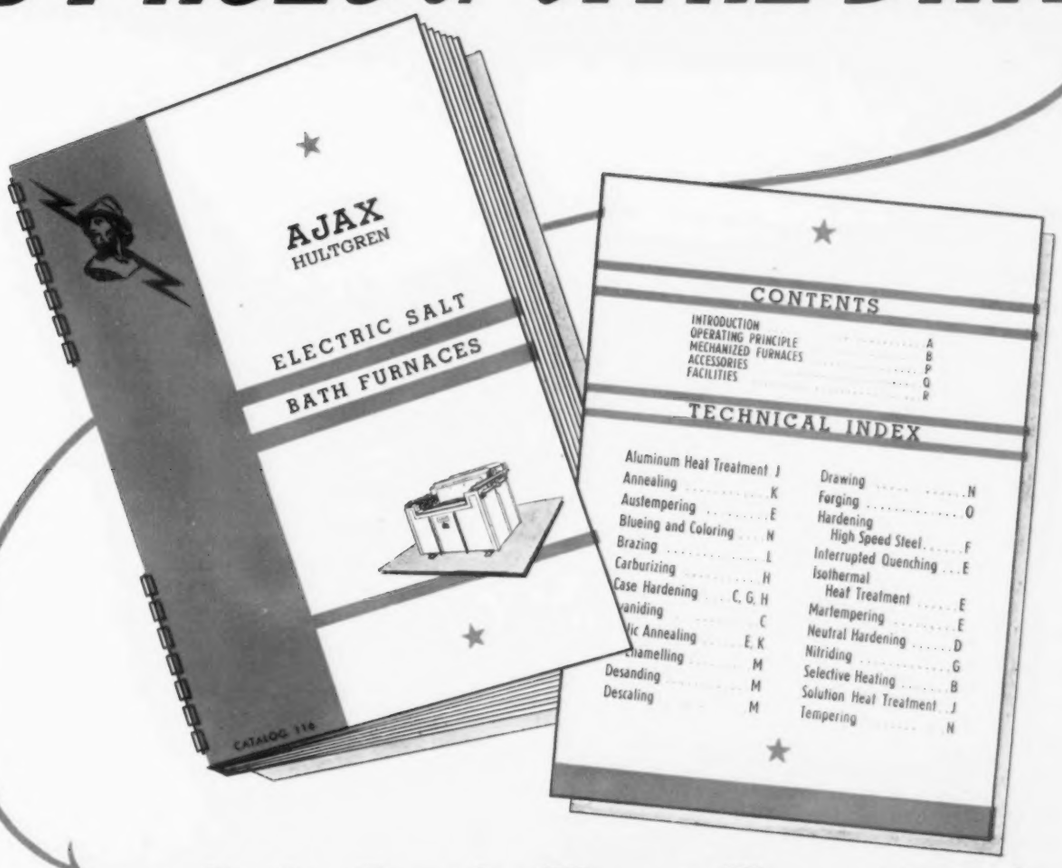
Sir:

I would like to obtain a copy of the article "Carbursintering of Iron Powders" by A. S. Margolies which appears in the Feb. 28 issue.

J. R. KUNKEL
Metallurgist
Fansteel Metallurgical Corp.,
N. Chicago

● Tear sheets have been forwarded.—Ed.

56 PAGES of VITAL DATA



on Salt Bath Heat Treating!

Glance at the contents of this new catalog. It is comprehensive . . . factual . . . illustrated. It will be of direct interest to those in any way associated with heat treating. The data it contains are based on the past performance of more than *twenty-five hundred* installed Ajax furnaces . . . and the unceasing research carried on by Ajax engineers. The Ajax Electric Company makes nothing but electric salt bath furnaces . . . using the famous immersed electrode internal heating principle. Ajax people live and eat with them. Hence, there are more Ajax furnaces installed than all other electric makes combined. Yes, and there has been amassed a vast experience and huge fund of knowledge on the subject of liquid heat treating . . . all of which is available for the asking.

Write for the new catalog 116, using your business letterhead, please

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This Industrial Week . . .

- ***Steel Shortage Is Factor in Coal Crisis***
- ***Ingot Rate Drops Nine Points to 79 Pct***
- ***Stainless Steel Products Raised 8.2 Pct***

THE national crisis and the blow to reconversion on which John L. Lewis has banked to push action on his demands for the coal miners are well on their way this week. Within the next 10 days or so, the steel ingot rate will take another sharp drop which will be followed by all the unbalances and trouble in getting started again towards higher ground after the coal strike is settled.

The steel industry, not being a seller of coal but a large user from its own mines, has reluctantly become the focal point from which the government will attempt to end the coal mining stoppage. The national prominence and the serious aspect of a new steel crisis following soon after the ending of the steel strike will be the sounding board for various attempts to end the coal impasse.

Actually, steel companies are only remotely connected, if at all, with the commercial sale of coal. Their representatives, however, must attend the negotiations between the coal operators and John L. Lewis because the wage scales agreed upon are written into the contracts which the United Mine Workers have with "Captive" coal mines owned by steel companies. Thus an industry which is not connected with the main coal controversy in a commercial way has in the past several years become the spearhead which has been involved in the ultimate settlements.

This week the steel ingot rate for the country has dropped to 79 pct of capacity, a decrease of 9 points from last week's revised rate of 88 pct. More serious, however, is the certainty that the rate will take another sharp dip next week.

Most major steel companies were able this week to maintain maximum activity, but an important segment of the industry has been forced rapidly to reduce its output to extremely low levels, thus bringing down the average for the country. Within two weeks those steel firms which have been able to maintain output must cut back sharply if there are no signs of a coal settlement.

WHAT the government can do in the coal crisis remains anyone's guess. At one time when the government took over the mines, the men refused to go back to work. The history of coal strikes indicates that no coal is mined until John L. Lewis tells the men to return to the pits. The question under discussion between Mr. Lewis and the operators are such as to lead many in the trade to look for a long shutdown.

Steel users hastening the process of stepping up production of civilian goods are in for several headaches because of the tight steel situation. Optimistic schedules of operations for the immediate future will have to be trimmed sharply. Up to this week most steel consumers have held on to the belief that there was enough steel for their near-term output of autos, refrigerators and other items actively sought after by customers.

The significance of the terrific steel loss during the steel strike is only now being realized by most steel consumers. This is made all the more serious by losses already incurred because of the coal strike and those which will materialize over the next several weeks.

MANY manufacturing concerns whose steel supply has been reduced below what they had hoped to obtain are rapidly eliminating all overtime and establishing a 40-hr week. A still shorter work week may be in prospect at many plants if the steel stringency becomes more severe as well it may with a long coal strike. The curtailment trend because of lack of steel may also be influenced by inventories becoming more and more unbalanced due to the varying availability of particular products.

The inventory level of bottleneck products in many cases may be the determining factor in setting production rates at manufacturing plants. While the steel ingot rate will rebound after the coal controversy is settled, it will not necessarily reflect a similar pick-up among users of steel. Production of steel products is still unbalanced with respect to consumer demand and represents an aftermath of the troubled steel distribution picture during and after the steel strike. The recent price advance on steel products has also contributed to an uneven production.

Although the price increase for various steel products was well received, in most steel industry quarters some segments are convinced that further adjustments may be necessary at the end of the 90-day period mentioned in the OPA order. Disproportionate adjustments among individual products, some steel firms claim, leaves little incentive to roll certain items in short supply and the request for further adjustments will be concentrated at these points. The future success of any demand for further price advances is most definitely not a foregone conclusion.

SUBSTANTIALLY all makers of stainless steel which is not under OPA control have advanced their prices 8.2 pct. Whether or not this advance will stick in all cases remains to be seen. Due to competition from other materials and the highly competitive setup in the stainless steel industry, posted prices have not always been maintained and going prices have become quite elastic in certain periods. Some steel sources are seriously worried about the inroads which might be made by other metals if the stainless steel price goes too high. On the other hand labor costs and the fact that alloy steel was not advanced as much as the industry was led to believe has forced an increase on stainless steels.

• **WIRE FOR SALE AS FENCING**—Declared as surplus by the Army, the War Assets Administration has placed on sale in a nationwide continuous program approximately 200,000 rolls of camouflage wire valued at more than $4,000,000. The wire is being offered for sale as wire fencing and is priced below the standard price for such material. WAA said that it could be used as sun screening, in soil conservation, as snow breakers and merely as fencing. Both galvanized and enameled wire are included in the offering, although they are priced only as enameled. They have been stored together in quantities which make it impractical to ship specific types. Hence purchasers will be required to take the run of the pile.

• **BRITISH OPENHEARTH CONSTRUCTION** — Whitehead Iron & Steel Co., located at Newport in South Wales, has completed plans for a new Siemens openhearth plant to be located near their present Courtybella works costing approximately $4,000,000. Trade sources indicate that construction will include five 120-ton furnaces and some electric furnace capacity may be added. Best information in England today indicates that orders for the equipment have not yet been placed.

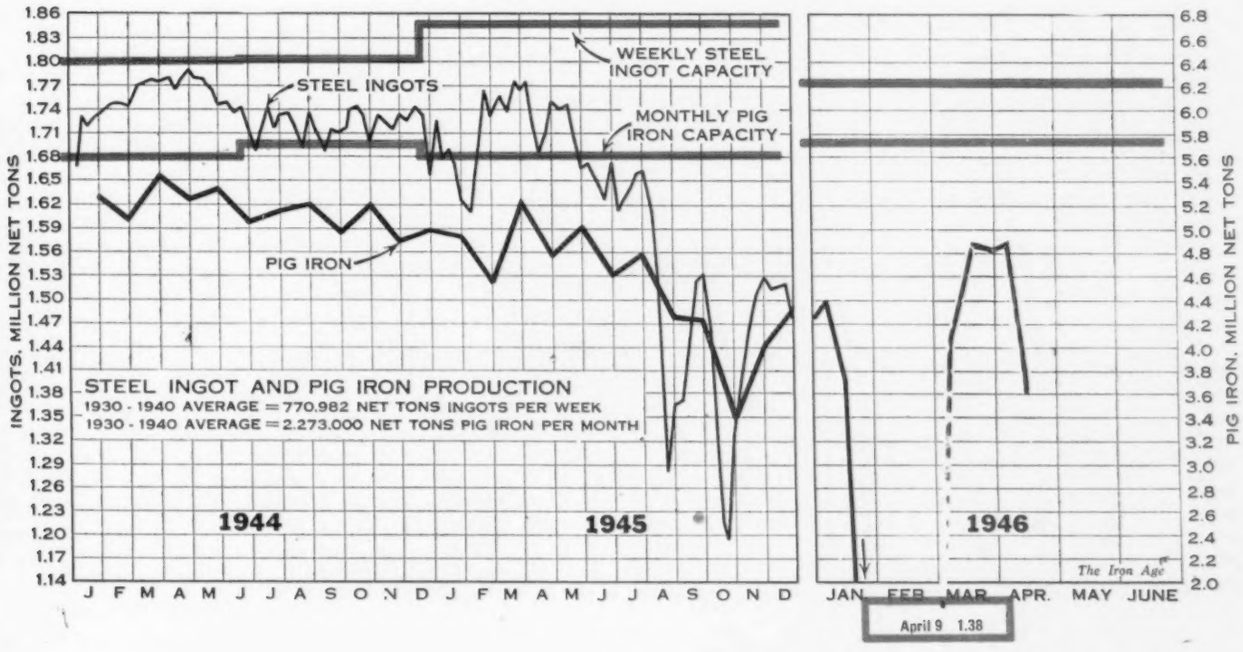
• **CALLS FOR BUDD MERGER**—Merger of the Edward G. Budd Mfg. Co. and the Budd Wheel Co., the surviving concern to be known as The Budd Co. was proposed to shareholders by Edward G. Budd, president of the two companies. Shareholders will pass upon the proposale at meetings to be held here June 11. The unification, Mr. Budd said, "has long been contemplated in the interest of unified direction, diversification of products and more efficient operation."

• **PLANS FOR NEW CONSTRUCTION DATA**—All federal agencies have been asked by Ivan A. Bickelhaupt, chairman of the Inter Agency Construction Coordinating Committee, to submit by the middle of the present month a full report of new construction proposed in the next fiscal year "so that it can be screened for essentiality and deferability." Mr. Bickelhaupt made his request at a session of the committee.

• **STEEL CABINET PRICE FORMULAE**—If present ceiling prices of low-cost steel utility cabinets, wall cabinets and wardrobes are below (1) total cost of production plus a 2.4 pct profit margin and below (2) stated cut-off prices to retailers, then ceilings may be raised to equal the lower of (1) or (2), OPA has announced. The increase may be passed on to the customer.

• **AT LONG LAST**—The Yale & Towne Mfg. Co. strike which lasted 21 weeks and attracted national attention apparently is over. As soon as union members ratify the new contract, the 2500 Stamford, Conn., and 1700 Philadelphia employees will return to work. Details of the settlement have been withheld by the company and union. It is reliably stated, however, the union settled for a 12½¢ an hr increase in pay and compulsory checkoff.

• **COKE RESTRICTED BY CPA**—Because the present coal strike will have an immediate adverse effect on coke production, the Civilian Production Administration issued Direction 10 to Priorities Regulation 32 to prevent the piling up of excessive coke inventories. It was effective Apr. 2. Industrial users, including utilities, will be restricted to a 20-day supply of coke.


INGOTS, MILLION NET TONS
PIG IRON, MILLION NET TONS
WEEKLY STEEL INGOT CAPACITY
STEEL INGOTS
MONTHLY PIG IRON CAPACITY
PIG IRON
STEEL INGOT AND PIG IRON PRODUCTION
1930 - 1940 AVERAGE = 770,982 NET TONS INGOTS PER WEEK
1930 - 1940 AVERAGE = 2,273,000 NET TONS PIG IRON PER MONTH
1944
1945
1946
J F M A M J J A S O N D J F M A M J J A S O N D
JAN. FEB. MAR. APR. MAY JUNE
April 9 1.38
The Iron Age

Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
April 2	86.5*	92.5	79.0	91.5	96.0	104.5	94.0	95.0	90.5	60.0	88.0	71.5	94.0	88.0*
April 9	73.5	71.0	70.0	89.5	94.0	104.5	94.0	95.0	96.0	59.0	92.0	72.0	97.0	79.0

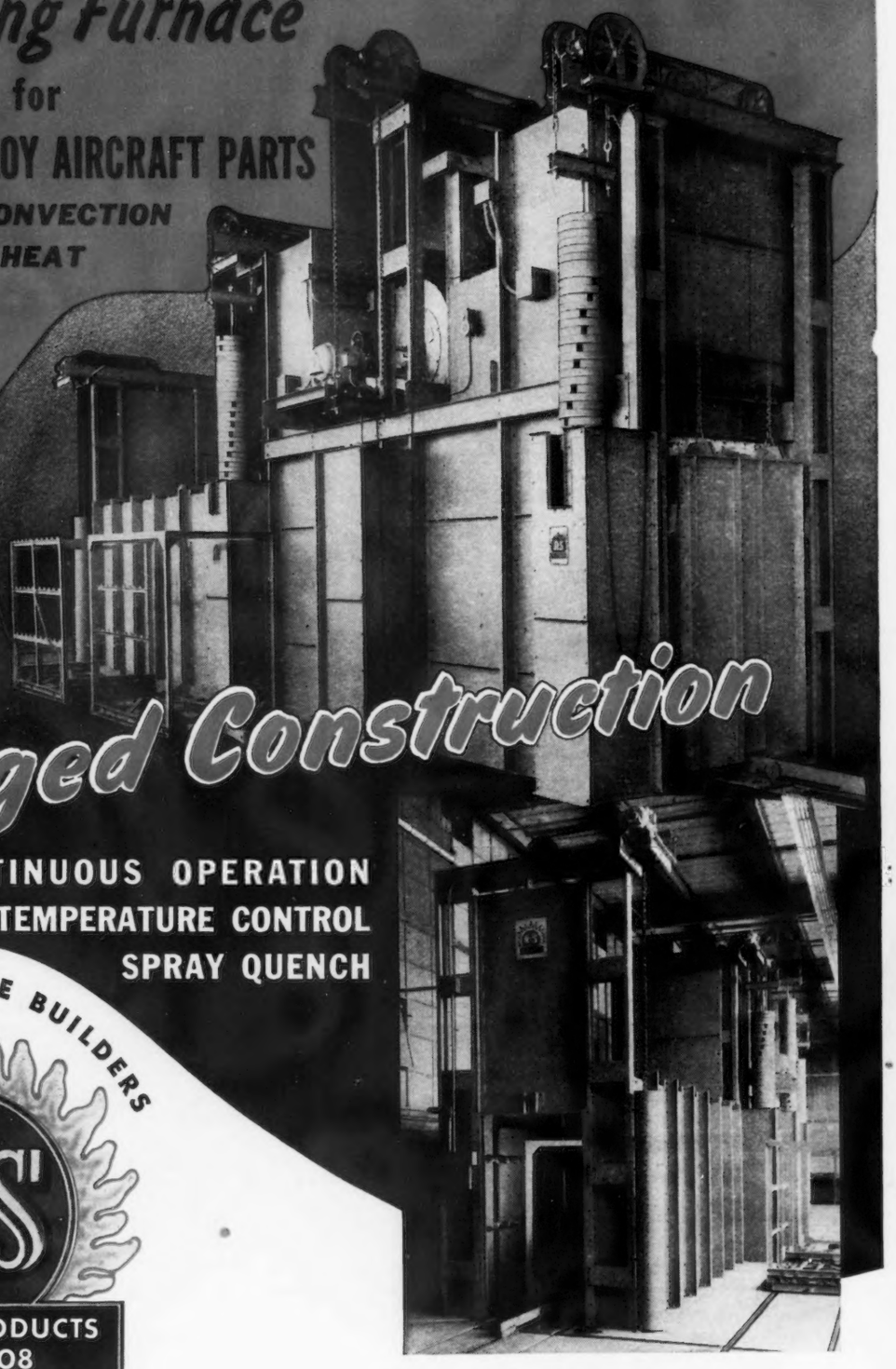
* Revised

Tandem Chamber Heat Treating and Aging Furnace

for

ALUMINUM ALLOY AIRCRAFT PARTS

- FORCED CONVECTION
- ELECTRIC HEAT



Rugged Construction

SEMI-CONTINUOUS OPERATION
AUTOMATIC TEMPERATURE CONTROL
SPRAY QUENCH

MASTER FURNACE BUILDERS

R-S

QUALITY PRODUCTS SINCE 1908

General Offices: Philadelphia 44, Pa.

New York • Detroit • Pittsburgh • Chicago
Buffalo • Cincinnati • Cleveland • Houston
Washington • Los Angeles • Buenos Aires
Rio de Janeiro • Sao Paulo • Mexico City

FURNACE DIVISION

R-S PRODUCTS CORPORATION

Manufacturing Engineers

Canadian Steel Mill Expansions Foretell Reduced Imports

By F. SANDERSON

Toronto

• • • **Expansion programs** carried out by Canadian steel companies during the war years brought mill capacity to a total that is sufficient to provide for practically all demands of the Dominion under normal conditions. At the end of 1939 Canada's rated capacity for steel ingots and castings totaled 2,346,000 net tons, and at the end of 1945 this capacity amounted to 3,623,400 net tons, an increase of 54.45 pct, while blast furnace capacity was increased from 1,625,000 net tons in 1939 to 2,770,760 net tons at the end of 1945, or a gain of 70.5 pct.

For the 3-yr period ended with 1939 the average production of steel ingots and castings was 1,397,664 net tons and pig iron 880,948 net tons per yr, while for the year 1944 output of steel ingots and castings totaled 3,024,410 net tons and pig iron 1,852,623 net tons, and for 1945 production of steel ingots and castings amounted to 2,881,323 net tons and pig iron 1,777,958 net tons.

Large additions were made to rolling mill departments in the war years with the result that some companies have not sufficient open-hearth capacity to provide steel for all finishing departments, and this condition has been reflected in serious shortages of a number of finished products to meet abnormal demands that exist at this time. The prevailing heavy demand for all steel materials has resulted in the plugging of Canadian steel mills with orders and despite efforts of producers to hold down backlogs, delivery on new order account now extends well up to the end of the year on some materials. It is estimated that it will take Canadian steel producers about 2 yr to bring conditions of supply and demand under control and for the steel markets to return to normalcy.

Not only did Canadian steel companies make substantial enlargements to primary iron and steel capacity, but large additions were made to rolling installations and many new lines of production were added during the war years. The inclusion of new steel lines go a long way to make this country independent of foreign supply, but there are still some items in the specialty steel lines that will continue to be imported as Canadian interests point out that to include these, with somewhat limited demand, would be too costly to warrant the necessary installations.

It is generally conceded by Canadian steelmakers that while Canada will continue to depend on imports of some steel materials, a number of lines that were imported in large volume previous to 1940 can now be supplied within the Dominion. Curtailment in steel imports would affect the United States more than any other country, as Canada long has been its neighbor's best customer for iron and steel and their products. Previous to the outbreak of war imports of iron and steel and their products from all sources averaged in value approximately $150,000,000 a yr, of which the United

• • •

OVER THE BACK FENCE: *Odd jobs at home ordered by coal miners' wives could end the coal strike if it lasted too long.*

States provided about $120,000,000. The chief items in the import list were motor vehicles, machinery, agricultural implements and rolling mill products. As a result of plant expansion programs carried out in the past 5 yr, together with other large additions and new production units planned for erection in the immediate future, imports of even these more critical materials will be substantially reduced.

Imports of iron and steel from the United States in the war years averaged about 3,000,000 tons annually, and according to reports from Ottawa since VJ-Day, these imports had dropped to about 1,000,000 tons yearly basis, before the steel strike across the line. So far this year steel imports have been further sharply reduced, due, largely, to the fact that the United States producers were unable to meet the Canadian demands. However, with difficulty in obtaining steel from the United States, consumers that formerly depended on that country for supply have turned to Canadian producers for more speedy delivery and it has been discovered that to a large extent domestic steels are meeting requirements.

While there is every reason to look for a very broad reduction in iron and steel imports from the United States, with continued steady curtailment as time advances, a number of special lines will continue to flow into this country as facilities for their manufacture have not been provided in Canada. For a few years at least, Canada will depend on the United States for heavy structural sections, as blooming mills here have not the size and capacity for the large ingots necessary for this class of shapes. Pigs, blooms and billets will continue on the import list insofar as special analyses are concerned. Some castings and forgings also will be imported as Canadian plants are not equipped with the necessary dies, and the cost of installations would be too heavy to warrant the expenditure under existing conditions. Some rolling mill products will remain in the import list because patent rights are not available to Canadian companies, and seamless tube, pipe and fittings of special alloy content, as well as special grades of wire and hardware not made in Canada due to patent control and machinery under special patent rights will not be available to Canadian producers for some time to come.

With regard to most other items of iron and steel, numerous enlargements to plants and equipment have been carried out by Canadian firms and with these added facilities domestic production will go a very long way in meeting requirements in this country.

Price Rules Removed on Selected List of Heavy Machinery and Equipment

Washington

• • • **Suspension of price control** on a selected list of heavy machinery and equipment products—the most extensive decontrol action yet taken by OPA—was announced on Apr. 8 by Administrator Paul A. Porter.

Effective Apr. 8, the action predicted in THE IRON AGE, Apr. 4, P. 120, suspends price control on commodities, mostly capital goods, in six broad classes of machinery and equipment. Included are many items of electrical equipment, machine tools, processing, construction, transportation and miscellaneous machinery and equipment.

Manufacturers of power-driven machine tools not covered by the suspension action, also the parts and attachments when designed for a specific machine tool produced by the tool manufacturer, will be allowed a flat 20 pct increase over their Oct. 1, 1941 prices. Effective date of this increase, which will apply to all machine tools, parts and attachments covered by MPR 67, will be announced within a few days when the formal action is issued.

Major product lines being suspended from price control are:

Electrical—Steam hydraulic and gas turbines; direct current arc welding equipment; electric motors, 250 hp and over; all types of transformers, 500 kva and over; telephone central station and other telephone equipment; antenna systems and towers; domestic watt-hour electric meters.

Machine Tools—Large types of both new and second-hand machine tools (as defined in MPR 67—new machine tools; and MPR 1—second-hand machine tools—respectively).

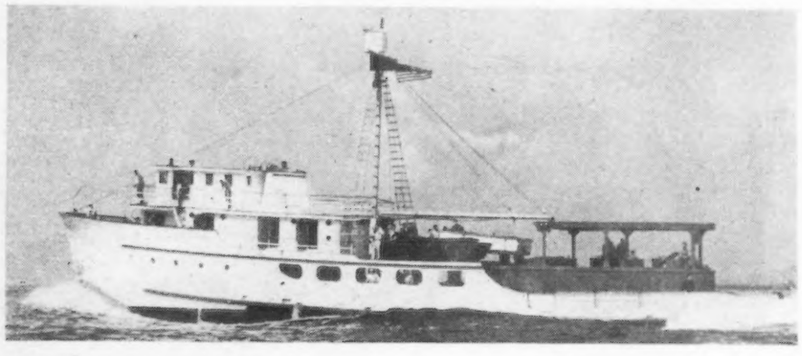
Processing Machinery — Many types of textile machinery; specially built web-fed, newspaper and magazine printing presses.

Construction Equipment—Dredges; lock and dam machinery listed in revised MPR 136, Appendix A.

Transportation Equipment—Locomotives and tenders, freight cars; passenger cars for surface, subway or elevated lines; many railroad parts and specialties; industrial hand trucks; passenger and freight elevators and escalators.

Miscellaneous — Industrial casters; mechanical precision springs; gaskets; dies, jigs, fixtures, molds and patterns with

HEAVE-TO FOR THE TUNA CLIPPER: *This all-steel, sea-going vessel is under construction at Avondale Marine Ways, Inc., New Orleans. Keel was laid Mar.* 22 *and completion is scheduled for July* 31. *Over-all length is* 132 *ft, with a beam of* 30 *ft. Powered by an* 840*-hp diesel engine, these ships will have a speed of* 12 *knots.*



some exceptions; open flat die forgings, except commercial drop forgings; tire chains; diesel engines with some exceptions; steam generating equipment; industrial and marine stokers with feeding capacity of 1200 lb per hr or more; industrial conveyors and conveying systems of stationary type with some exceptions.

"Suspension action conforms with Directive 68 issued by the Office of Economic Stabilization," Mr. Porter said. "Several products fall in the category covered by Section 1 of that directive. They are commodities in which demand and supply for potential supply are in sufficient balance now that prices will not rise unduly above existing ceilings or levels to which they would be raised in conformity with the agency's standards. In many cases, manufacturing capacity of the industry was greatly expanded during the war and is now supplying the country's peacetime requirements."

Included in this Section 1 group are direct current arc welding equipment; industrial lifting magnets; specified types of switch gear; some baling presses; certain types of foundry machinery and equipment; specified industrial trucks; mechanical precision springs; open and flat die forgings, except commercial drop forgings; tire chains; hand operated tools especially designed for military aircraft and vehicle repair and maintenance.

•

Washington

• • • **A revision of** the pricing provisions of the OPA regulation for machines and parts, designed primarily to adapt the regulation to the needs of manufacturers in the industrial changeover to production of more standardized peacetime products, was announced Apr. 8 by OPA.

The revision becomes effective Apr. 13, and is applicable in pricing of products covered by OPA's general machines and parts regulation, including radio parts, electric motors and electrical parts, printing machinery, textile machinery, stamping machinery, processing machinery, general auxiliary machinery and service equipment, bearings, can-making machinery, building materials manufacing machinery, chains and chain products, chemical making machinery, glass making machinery, diesel engines and others.

Principal features of the revision are:

(1) Producers of products modified by changes in materials or components previously used when applying to OPA for ceiling prices for such items, must check their proposed prices to see that they are "in-line" with the most nearly comparable item already priced and being sold in general trade. Only proposed prices which are "in-line" with the most nearly comparable item will be approved by OPA.

(2) A manufacturer producing an item which he never made before must also apply the test of "in-line" pricing. This provision, previously introduced by Amendment No. 10, effective Aug. 24, 1945, is restated for clearer instruction to manufacturers. The regulation now requires even the manufacturer who does not propose to publish his prices for newly added products to use his recomputed price after having gained experience in its manufacture as his ceiling for all subsequent sales of those new products.

Recomputed prices may be submitted to OPA in any form the manufacturer wishes. The standard OPA Form 694-2166, upon which manufacturers previously were required to submit recomputed prices, has been eliminated.

(3) Manufacturers who have been using the base date method of pricing their products hereafter will be permitted to change their pricing methods if present ones have become unappropriate because of technological changes in production methods or costs. Proposed new pricing methods may be submitted to the OPA national office in Washington for approval.

(4) The regulation now gives greater weight to manufacturers suggested resale prices in those cases where it has been the practice of the trade to use them as resale prices where OPA has established them as such.

(5) Appendix A of the regulation, which lists the commodities covered, is amended to include more, as well as more detailed, commodity headings.

Urgency Certificates To Be Issued by CPA

Washington

• • • **Issuance of urgency** certificates which give top preference in purchase of surplus government machinery and equipment to producers who need it to maintain production of critical products has been announced by CPA.

Under Direction 16, PR 13, they will be issued only for equipment needed by producers of commodities classified as critical under Schedule 1, PR 28. This schedule includes the following:

Coal mining machinery, clay building products machinery, grey and cast iron castings (including cast iron soil pipe, cast iron radiation and railroad car brake shoes), concrete building products machinery and equipment, fractional horsepower AC motors, and electrical high-silicon sheet steel.

An urgency certificate does not guarantee holders will get equipment.

EXIT LST'S, ENTER COAL BARGES: *Welded steel barges instead of LST's are splashing into the Ohio River at Ambridge, Pa., as peacetime production accelerates into high speed at U. S. Steel's American Bridge Co. This photo was taken not far from the Navy shipyard where the company built and launched ships during the war. Here is one of 75 new coal barges being built for the river fleet of Carnegie-Illinois Steel Corp.*

Navy Recovers Aluminum and Byproducts from Wrecked Planes

Jacksonville, Fla.

By JOHN ANTHONY

o o o

• • • **One of the most** interesting developments in the application of efficiency engineering to salvage operations has been worked out by the Navy with respect to wrecked and obsolescent aircraft at the Naval Air Station here. The principal product of a new Navy designed smelting plant which went into production on Jan. 5 is aluminum ingot, 400,000 lb of which has already been shipped and 2 million lb additional has been produced and will soon be offered for bids. Another principal product is lead pig, reclaimed from lead counterbalanced areas of aircraft. In a good day 3000 lb of lead pig is produced in a melting furnace of unique design.

Aluminum melting is handled by a sloping hearth reverberatory furnace of 10,000 ton capacity with one door 6 ft wide, planned originally to permit charging an entire wing into the furnace. At the time the furnace was designed it was far in advance of the field in the size of its charging door and other details. (For additional details of the equipment, see "Navy Disposal of Aircraft Aluminum Scrap to Produce 15 Million lb of Secondary Metal" in THE IRON AGE, Dec. 20, 1945.)

The entire plant has been designed to make use of available surplus and scrap materials and equipment, thereby cutting down the Navy's plant investment and expediting installation. By way of example, the aluminum furnace and the smaller lead melting furnace are designed to operate on crankcase drainings from wrecked aircraft. Likewise, the pig conveyor was recovered out of surplus material.

One important factor in assuring recovery of all products for sale at the most profitable market, also assuring maximum purity of the aluminum heats, has been a careful analysis of steps economically suited to break down an aircraft into its most desirable components and adherence to that procedure within the limits of available manpower and economic considerations. Lead counterbalances, for instance, are clipped off the wing tips in the preliminary dismantling of the plane, and the aluminum covering is later burned away.

Aircraft are cut into easily handled segments by means of the torch before charging into the furnace. This practice was an outgrowth of an exhaustive study of all possible techniques of handling aircraft, including the charging of whole sections into the furnace, cable cutting of aircraft by use of a jig and winch-powered steel cable, crushing in a press and other methods. By cutting torch technique it is practicable to remove all valuable items of equipment and metals from segments small enough to be readily manageable.

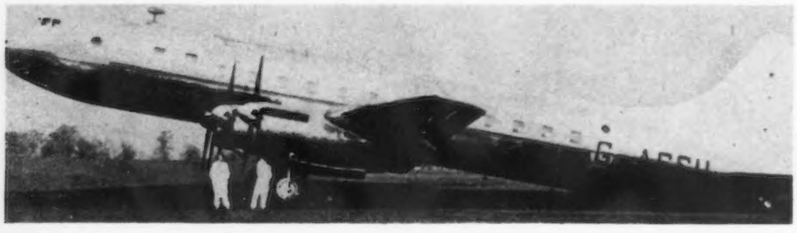
Until now every heat of aluminum has been sent for spectrographic and chemical analysis to the Bureau of Mines in Washington. Now, only every tenth heat will be analyzed for, strangely enough, it appears that customers are not significantly concerned with exact analyses, and require only reasonable standards of purity. Each bar is identified as to heat number and the bids call for the following ranges or maximums of impurities: Cu 3.50 to 5.00, Fe 0.90, Mg 1.50, Mn 0.65, Ni 0.05, Si 0.50, Sn 0.10, Zn 0.35, Cr 0.15, Ti 0.05, Pb 0.01 to 0.20. From these percentages it is apparent that the Navy's smelting operations permit the most significant impurities, lead and iron, to be held quite low. This is largely attributable to the preliminary processing of the aircraft in which portions containing significant weights of these metals are removed. Also, the melt is drossed off in the furnace every 2 hr, at which time steel and other unburned metals are removed from the heat. Moreover, the melters are careful not to stir the heat. Ingots are poured at 1400° F., cool enough so as not to form an oxide coating on the ingot.

The Navy will provide a heat analysis if required by the customer, and cars will be loaded with ingot segregated by heat number. At the present time the ingot production is in both solid and notched ingots. But when the notched type of ingot molds are available out of surplus products, the pig machine will be converted completely to the notched type of mold since it is considered more flexible for consumer's needs. The notched ingot weighs 15 lb, 2 lb less than the solid ingot. More recent sales catalog offer aluminum ingot on the basis of an average-maximum-minimum pct of alloying elements as follows: Cu 3.00 to 5.00, Fe 0.65 to 0.90, Mg 1.00 to 1.50, Mn 0.53 to 0.65, Ni 0.01 to 0.05, Si 0.29 to 0.50, Sn 0.01 to 0.10, Zn 0.19 to 0.35, Cr 0.05 to 0.15, Ti 0.00 to 0.05, Pb 0.01 to 0.20.

The Navy is selling drossings at $3.60 per gross ton f.o.b. Jacksonville, and has already disposed of 86,000 lb in the less than four months the smelter has been in operation. No. 1 heavy melting steel removed from the aircraft is sold at an average of $14.00 a gross ton f.o.b. Jacksonville. The Navy has concluded a contract for structural steel with aluminum attached, at $10.00 per gross ton.

Cast aluminum is segregated and the Navy is receiving better than 6¢ per lb for it without the necessity for passing it through the fur-

GIANT AIR LINER: *Britain's new air liner, the Tudor II, has a wing span of* 120 *ft, length of* 105 *ft* 7 *in., and height of* 24 *ft* 3 *in. As a* 60*-passenger plane the Tudor II has a range of* 1850 *miles at* 230 *mph at* 20,000 *ft. Used as a freighter it can carry nine tons of cargo for* 1100 *miles. The liner has already completed its maiden voyage.*



nace. Since the ceiling price for aluminum ingot is 6¼¢ per lb, this practice is just good business sense.

At first the plant segregated its stainless steel and high alloy scrap, believing that a better market price would be obtained for them. However, the management found that a better realization could be had by throwing the stainless, alloys, and even costly turbo-supercharger buckets in with unprepared aircraft scrap. This also applies to the high molybdenum content trialloy landing gear tripods of the SAE 4300 series. By sweetening the unprepared aircraft scrap with some cast aluminum parts, consumers are offering a higher price for this material.

Armament is carefully inspected to assure the removal of all live ammunition, and cartridge cases are segregated, as well as other light and heavy brass and copper parts. Until now prisoner-of-war labor has been available in adequate quantity, and many operations were possible which can not now be undertaken because of a more stringent labor picture. For example, brass is not now segregated into light and heavy grades. The Navy's labor supply is largely white, includes many veterans, and is judged to be of better than average calibre in order to handle the critical classification and segregation work properly.

Armor plate is sold as special treatment steel, as is, at a price of $10.60 per gross ton. Radium painted instrument dials are sold at 18¢ per lb. The lightweight ignition cables are stripped out of their cable covering and are sold at 2.5¢ per lb with a guarantee of no lengths of less than a foot. Radio equipment not of further use to the Navy, nor restricted by secrecy, is sold at 5¢ per lb in 10,000 lb lots. The engine mount tubing is segregated and the Navy expects to get $8.50 to $10.00 per gross ton for this tubing.

The Navy personnel principally responsible for the efficient systems of disposal for aircraft and other Naval Air Service surplus materials are Lieut. (jg) R. C. Brigleb and Lieut. (jg) C. D. Hosfield, under the command of Capt. H. C. Stoa, supply officer of the Jacksonville Naval Air Station. Lieut. Brigleb entered the Navy with experience in the disposal of production scrap for Thompson Aircraft Products Co. Lieut. Hosfield came from the Minnesota State Engineering Dept.

War surplus materials are screened against scrap and critical lists in order to obtain the maximum benefit out of all surplus materials. The station is handling an average of a million dollars per month in spare parts disposal, without including tires, radio and radar equipment, etc. Tin cans are sent to the Southern Detinning Co. for detinning. All insulation is burned off copper wires, which are then sold as burnt copper. The base produces 25 tons of scrap tires and 25 tons of inner tubes in a 90 day period.

One of the first problems confronting the Navy in beginning smelting operations was said to be that of collusive bidding by dealers in the adjacent areas. The station was able to break up this practice by refusing to accept bids at prices out of line with the normal market, and then extended its field of market operations. Now that there has been some four months experience with disposals, the Navy finds that the expressions of interest in its activity here are coming from an ever widening circle of consumers.

The average heat produced in the aluminum furnace is 7500 to 8000 lb. In one day, comprising two eight-hour shifts, 32,000 lb of ingot aluminum was produced. The standard practice of the melters is to weigh everything going into the furnace and compare it with the weight of ingot production. Lieut. Brigleb contemplates an aluminum ingot production of approximately 13 tons per day when the plant gets into its full stride.

Register of Patents Office Well Received

Washington

• • • **Widespread public** acceptance of the Register of Patents available for Licensing for Sale, established in the Patent Office last June as an aid to the nation's inventors, has been disclosed by a survey, according to a Dept. of Commerce statement.

T. P. Reynolds, Chief of the Patent Office Mail and Files Div., said that there are now listed in the Register more than 10,000 patents which owners are offering for licensing or outright sale.

To determine whether the Register is really fulfilling its purpose, the Patent Office recently sent letters to 286 individuals, corporations and companies owning the first 500 patents listed on the Register, asking if the listing had been of any value. A total of 187 replies were received. Only 66 owners reported that they had not received any inquiries regarding their patents. The others reported they had received from one to 17 inquiries each from interested persons. Twenty-eight of the patent owners said they had sold or licensed their patents, had received offers, or were carrying on negotiations for their sale or license.

In addition to listing patents available for licensing or sale, the Register also lists patents dedicated by their owners to the public for free use and unquestionably many of these patents will be utilized by interested persons, Mr. Reynolds said.

KING OF ARTILLERY WEAPONS: *Shown in full recoil after delivering one of its 350-lb shells, this huge howitzer is a self-propelled, 240 mm gun, developed too late for use in World War II.*

CPA Imposes New Restrictions on Lead

Washington

• • • **Designed to bring** permitted demand down to the indicated supply level, CPA has announced a number of new controls on lead, one of which reduced second quarter allocations approximately 10 pct while another cut permissive inventories from 45 to 30 days' supplies. In taking the latter action, CPA transferred inventory controls from M-38 to PR-32. The tighter inventory restriction was imposed, CPA said, to prevent speculative hoarding and the resultant unbalanced distribution which would curtail total production.

A new lead chemical order, L-354, further restricted the amount of lead which may be used in insecticides and lead chemicals. A new ethyl fluid order, L-355, cut to 27 pct of the amount of such fluid used in November-December 1945, and January 1946, which may be used monthly, beginning with April, and limited motor gasoline to an 80 octane content.

Revised allocations of lead for the second quarter, most of which are contained in the newly amended lead conservation order M-38 effective immediately, will total approximately 230,000 tons compared with 257,000 tons in the first quarter of 1946.

Other changes in the lead conservation order (M-38) include:

(1) Cable coverings second quarter allocations have been reduced from 33,000 tons in the first quarter to 27,000 tons in the present period.

(2) Lead for batteries will receive an allocation of about 66,000 tons in the second quarter. This is a decrease in permitted lead usage, as the battery industry will be required to hold all uses strictly within that amount, including all lead used for military requirements plus increased production for new civilian equipment. Lead allocations for batteries were previously reduced from 80,900 tons in the fourth quarter of 1945 to 66,000 tons in the first quarter of 1946.

(3) Essential civilian type ammunition. Uses of lead for this product have been curtailed through limiting uses to special allowable grants by the CPA. These grants will be considerably lower than such appeals allowed in the first quarter of 1946, CPA emphasized.

Coming Events

Apr. 22-27 National Plastics Exposition, New York.

Apr. 24-26 American Institute of Mining and Metallurgical Engineers, openhearth, blast furnace and raw material conference, Chicago.

Apr. 28-May 2 American Ceramic Society, annual meeting, Buffalo.

Apr. 29-30 National Welding Supply Assn., bi-annual convention, Dayton.

May 6-7 Assn. Iron & Steel Engineers, spring conference, Chicago.

May 6-10 American Foundrymen's Assn., golden jubilee convention and exposition, Cleveland.

May 29-31 Machinery Dealers National Assn., Atlantic City, N. J.

June 2-7 Society of Automotive Engineers, summer meeting, French Lick, Ind.

June 3-5 American Gear Manufacturers Assn., annual meeting, The Homestead, Hot Springs, Va.

June 13 Metal Powder Assn., spring meeting, New York.

June 17-18 American By-Product Coke Institute, first annual meeting, Seaview Country Club, Absecon, N. J.

June 17-20 American Electroplaters Society, annual convention, Pittsburgh.

June 24-28 American Society for Testing Materials, annual meeting, Buffalo.

Sept. 11-12 Society of Automotive Engineers, national tractor meeting, Milwaukee.

Sept. 16-20 Instrument Society of America, first conference and exhibit, Pittsburgh.

Oct. 3-5 National Electronic Conference, Chicago.

Stamping Prices Upped 19%; OPA Controls Off Some Consumer Items

Washington

• • • **Effective April 8,** OPA has granted manufacturers of metal stampings a price increase of 19 pct over their March, 1942, prices. This increase applies to all sales of stampings and replaces the 8 pct increase given stamping producers on Sept. 19, 1945. This previous increase was appplicable only to list and established prices. Before that time, prices of all stampings were frozen at March, 1942, levels.

Meanwhile OPA has suspended from price control several hundred consumer durable items for personal, office, household and professional use. Among items included are gang and power lawnmowers and business machines. Control, however, was continued over a long list of other consumer goods, such as heating and cooking stoves, washers and ironers, vacuum cleaners and mechanical refrigerators.

New OPA Materials Chief

Washington

• • • **Frederick C. Holder,** Lockport, N. Y., has been appointed Director of OPA's Industrial Materials & Manufacturing Div. Mr. Holder joined the OPA staff, September 1942, as a member of the nonferrous metals branch. Later he became assistant to the director of the Industrial Materials & Manufacturing Div. in which capacity he served for about two years; he was then appointed assistant director of the division. The division handles the pricing of metals, machinery, automobiles, chemicals, lumber, rubber, paper and drugs.

Weekly Gallup Polls . . .

American Public Foresees No Peace in Our Time

• • • **The past year** has seen VE-Day, VJ-Day, the formation of the UNO. Yet during the same period there has been an increasing belief that the United States will find itself in another war within the next 25 yr, according to George Gallup, director, American Institute of Public Opinion.

Today, virtually seven in every ten among the voting population say they see war for this country within the next quarter of a century.

Last year at about this time—just before the San Francisco Conference of the United Nations—only about four in every ten took the same view.

This marks a sharp increase in pessimism concerning the outlook for world peace.

Field reporters for the institute asked men and women in all parts of the country this question (the same as that asked in last year's poll):

"Do you think the United States will find itself in another war within say the next 25 yr?"

Here are the present results compared with those of a year ago:

	Now	Mar. 1945
	Pct	Pct
Yes	69	38
No	19	45
No opinion	12	17

Another reflection of the growing pessimism over the outlook for peace is the fact that more people expect war will come to the United States within 10 yr (49 pct) than thought last year that it would come within 25 yr (38 pct).

The young are usually called relatively optimistic, but that generality doesn't hold on the present question. A slightly greater proportion of persons 20 to 49 yr of age expect war within the next 25 yr than is the case among people over 50 yr of age. The same thing held true last year.

This is shown in the following table giving the vote on this question by age groups:

Age	Think war likely in 25 yr	Think no	No op.
	Pct	Pct	Pct
21-29 yr	70	17	13
30-49 yr	70	18	12
50 and over	65	22	13

• • • **The sentiment** of the American voters is overwhelmingly in favor of continuing the Selective Service Draft Law for another year.

A poll from coast to coast finds draft extension supported by two out of every three voters.

That is about the same proportion as favored the adoption of the original Selective Service Act in public opinion polls taken in 1940 just before the Act was passed.

The preponderance of sentiment for continuing the draft leaves little doubt that the American public believes the country should maintain considerable fighting strength for the present at least. The watchword is still preparedness, not disarmament, so far as the voting public is concerned.

The country's views were sounded on the following:

"The Selective Service Draft Law expires in May. Do you think Congress should or should not vote to continue the draft law for another year?"

The vote:

	Pct
Should continue	65
Should not	27
No opinion	8

Shortly before the law was put on the statute books in the summer of 1940, an institute poll found a vote of 67 pct in favor of the draft.

The high vote for continuation corresponds closely with sentiment shown for more than 3 yr on the question of peacetime compulsory military training.

Eleven separate opinion surveys on the issue during that time all showed a vote of 63 pct or more

Foretelling War in 25 Yr, Urges Draft Law Extension And Get Tough With USSR

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for some kind of military training of young men in the post-war period.

When voters in this survey were questioned about the age at which men should be drafted, and the length of service, the consensus was that the period should be 1 yr and the age bracket 18 to 28.

Congressman Martin of Massachusetts and others have advocated a plan whereby Russia, Britain and the U. S. should renounce peacetime training and armaments.

This proposal does not, however, seem to jibe with the present mood of the country. When the issue was put to the public in a poll completed just before the UNO Security Council meeting in New York, the majority turned it down.

"It has been suggested that Russia, Britain and the U. S. get together and do away with armaments and military training. Do you think we should agree to this?"

	Pct
Yes	30
No	62
No opinion	8

The principal objections raised by the voters were, "we must be prepared in case of another war," and, "how can we be sure other countries will live up to the agreement."

• • • **The long-drawn-out** controversy among the United States, Britain and Russia over Iran has produced a sharp reaction from the American voters.

Russia's course concerning international affairs, including the delay in removal of troops beyond the original date, met with overwhelming disapproval from the American public, and the general attitude has been one favoring a show of firmness by our govern-

(CONTINUED ON PAGE 128)

Machine Tools Hold Key to Economical Plant Operation

Pittsburgh

• • • **Opening the 10th** annual Machine Tool Electrification Forum held by the Westinghouse Electric Corp. on Apr. 9 and 10 at Hotel William Penn, Pittsburgh, M. W. Smith, vice-president in charge of engineering, summarized the developments that were born of war in his talk, "Engineering—Today's Subject."

An impressive fact, he said, is the knack of engineers to invent and fabricate tools and equipment necessary for the exploration of uncharted fields. Two such tools were the network calculator by which conditions on power systems can be simulated by electrical constants on the calculating board and a reliable solution obtained, and the transient analyzed.

This latter development, by Westinghouse engineers, provides the means of solving a variety of problems through the use of electrical circuits in which combinations of inductance, capacitance and resistance can be connected in proper relationships and proportions to represent faithfully the factors in the analogous problem to be solved.

A product is no better than the basic materials that make it up, Mr. Smith stated. The gas turbine, for example, is an old idea that awaited development of alloys capable of withstanding terrific heats to make it commercially feasible. Westinghouse's "Refractaloy" has aided in this regard. The Fosterites, developed at Westinghouse and used to moisture-proof radio and radar during the war, increased the value, life and efficiency of this equipment. Fosterites are now finding similar peacetime applications.

The war-born idea of gun stabilization, Mr. Smith indicated, may serve as a background for applications in the machine tool industry. While it is unlikely that many of these servo-mechanisms and gyroscopic control developments for military use will be directly applicable to industrial control, the experience gained in their development and production might be directed toward the solution of some machine tool applications.

At the Wednesday afternoon meeting, Tell Berna, general manager of the National Machine Tool Builders' Assn., spoke of the current problems of the machine tool industry, discussing both the good and bad factors in the outlook. He pointed out that the huge surplus of machine tools now on the market must be moved and the best of them must be put into use. With more than 40 pct of the machine tools in this country obsolete—particularly in small plants and shops—the major task of the industry is to get these surplus tools into use where they will do the most good.

Further, Mr. Berna stated, there is a tremendous task ahead in the improvement of present machines. This country has signed a promissory note to its people to increase wages and the only manner in which this can be accomplished is by increased output per man-hour of work. This is the means of making wage increases real, and, while it was advocated 40 yr ago by a few voices in the wilderness, it has been only within the past 2 yrs that there is a general realization that increased productivity is the only basis upon which real increases in wages can be given. An increase in wages accompanied by increased living costs is a futile inflationary spiral that leads only to disaster.

Papers on "Case Histories and Practical Applications of Adjustable Speed Drives," "Tailored Motors for Reversing Service," "Industry Reports on Standardization," "Disconnect Circuit Breakers for Machine Tool Control," "Trends in Machine Tool Wiring Methods," and "Standardized Control Transformer for Built-In Application," all of which were more technical in nature, were also presented at the 2-day meeting. Several of these will be reported in more complete detail in THE IRON AGE.

In his talk, "Engineering for Tomorrow," Charles A. Scarlott, manager of engineering publications for Westinghouse, described outstanding scientific, engineering and material developments and their significance on the American standard of living. He said that the fabulous research and engineering developments of the war were promised to the American people and they are now asking if science is going to make good on these promises and when. As to atomic power, Mr. Scarlott said that it had three hurdles: government, economic and engineering. The extent of government restrictions is anyone's guess. Economic hurdles are not too formidable, since from a cost standpoint alone, a nuclear energy power plant of 1000 kw or larger can compete with coal-produced electric energy in many regions of the country.

Technical obstacles to a uranium fission power plant are tough and will hold up commercial use of this development. Other means of nuclear energy generation may be found, either by fission of heavy atoms into elements near the middle of the atomic scale or by synthesis of lightweight elements into heavier ones.

Much closer at hand is the gas turbine, the first new prime mover in many years. The success of this is bound inextricably to high temperatures and metals that can withstand them. Steam plants of a packaged unit type are also new products of interest. The first such unit develops 5000 kw and consists of a steam turbine, an ac generator, a steam condenser and all auxiliaries such as pumps, on a single bedplate. The condenser itself provides the foundation for the turbine, generator and auxiliaries.

Radar is expected to be of great use as a navigational tool on water and in the air, but it will have many valuable byproducts. The frequency spectrum has been increased hundredfold because of radar developments. Radar has also contributed much to the commercial applications of television.

More basic has been development work in motors. A new dc motor weighing 8½ lb has been devised that will develop 22 hp and will bring the gyroscope motor of an electric torpedo from standstill to 12,000 rpm in a fifth of a second. Another dc motor weighing 31 lb develops 18 hp and will bring the rotor of a gas turbine from standstill to 2000 rpm in

15 sec. Small induction-motor armatures were built for the atomic project that were able to withstand 500° F at a high vacuum without formation of gas by any of its insulating materials.

Moisture-proofing is also another huge field for development, and the discovery of Fosterite has permitted insulation on radio and radar apparatus that withstood terrific beatings from temperature variation and moisture. Silicones are extremely important from the standpoint of electrical insulation. Tests indicate that they are by far the best insulator for motors yet devised, but still too expensive.

Westinghouse developed a high temperature alloy some years ago as a substitute for tungsten lead wires in vacuum tubes, a development that eventually was to be used in gas turbines, jet propulsion and superchargers.

Limitations on the production of molybdenum in "chunks" of large size and multiplicity of shapes have been removed and the cost has been reduced about 66 pct. Its high melting point and high wear resistance at high temperatures, as well as its hot strength, thermal conductivity, and high modulus of elasticity are expected to make it useful in the production of crucibles, electronic tube filaments, welding alloys and high temperature engine parts.

Considering the "User's Future Requirements for Machine Tools," J. R. Weaver, manager of the Westinghouse appliance div. at East Springfield, Mass., outlined the trends in design and construction of machine tools of the future. It is a well-known fact, he said, that production efficiency during the war was about 60 pct as compared with prewar standards. We are now in the position of trying to pick up this lost efficiency, he said, and we must increase productivity per manhour of work not only to prewar levels but to make up for the failure to progress during the past 5 yr. Machine tool design and development suffered during the war because emphasis was on production rather than research, but now machine tools must bring about better and higher production, justifying themselves in actual cost savings.

Westinghouse Electric Corp. will need many machine tools, Mr. Weaver said, since the company makes a variety of products ranging from mass production items such as fans and refrigerators to tailor-made items such as large turbines and generators. Mr. Weaver outlined 10 requirements of machine tools.

(1) Size of Machines—Space is going to be important and it is economical to hold space to a minimum.

(2) Ease of Operation — Machines that require operators with the least skill should be made. Organized labor's drive is to increase wages of lower priced operators in greater proportion to those of the skilled mechanic. The machine tool must supply the skill formerly possessed by the man, since the inclination to learn a trade is becoming extinct.

(3) Maintenance of Machines—Machine maintenance must be kept to a minimum. Repairs should be simple and possibly instead of repairing machines, it will be necessary to design them so worn parts can be replaced by new parts ordered from the factory.

(4) Electrical Developments — Develoments along this line might be made in motors or control applications to reduce hand operations even further.

(5) Accuracy—The better, faster and more accurate means of inspection and measuring work than are being developed must be considered. Effort for greater accuracy must not be relaxed.

(6) Machine Construction—Closer tolerances will probably require increased attention to stiffer, more rigid machine construction. Even more sturdy construction may be required to withstand greater forces for faster removal of material.

(7) Control of Thermal Expansion—It may be necessary to consider the use of construction materials with near zero temperature coefficients of expansion to eliminate inaccuracies in operation due to overheating of machine sections. This would increase productive hours of a tool by eliminating warming up time and the necessity for resetting tools near the start of a run.

(8) Reducing Set-Up Time—Features to preset cutting tools to give finished tolerances without so much "cut and try" should be developed, as should features for expeditious gaging and measuring the machine surfaces produced.

(9) Special Purpose Tools — Further development is possible of special purpose tools in place of multi-purpose tools by elimination of adjustments and adaptations not necessary to a specific job. A mass production plant rarely makes use of some machine facilities and features. Better bearings, protection of bearings, lubrication and good use of coolants are now being accomplished.

(10) "Dream Tool of Tomorrow"—To build its proposed and planned products, Westinghouse will need a new type of machine. Better products are being sought, as are cheaper and more efficient methods of manufacture.

FLYAWAY $6100: *North American Aviation, Inc., Los Angeles, Calif. has announced the development of the Navion, an all-metal, 4-passenger airplane for the personal airplane field. The plane is powered by a 185 hp Continental engine. Prices are quoted flyaway, Los Angeles.*

Federal Housing Order Explained; Building Budget Slashed by $2 Billion

New York

• • • **Assurances** that the federal government's construction restrictions issued on March 25 were not as drastic as they sounded were given by John D. Small, Civilian Production Administrator and Wilson W. Wyatt, Housing Expediter at a closed meeting in City Hall with Mayor O'Dwyer and local building construction and labor representatives. Explanations given during a 2-hr session put a new complexion on the views of local government and building leaders, who now hold the opinion that the promised drastic cut in building will fall mostly in the field of private construction.

Mr. Wyatt told reporters that he and Mr. Small had come to New York to "clear up apprehension" about how the order might affect construction and that he had emphasized that it banned non-housing projects only if they were attempted "without permission."

It was not disclosed whether the city and federal officials discussed specific projects in the Mayor's capital outlay program on which he expects to accept bids by June 1. However, Robert Moses, construction coordinator, "who is in charge of the city's post-war program, said that in view of recent conversation he believed it would "not be adversely affected."

Any priority system, he asserted, offered obstacles, but the greater part of the city's program will be free of rationing of materials. Where "they will have to do a lot of cutting," he said, "is in the big area of private construction."

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Washington

• • • **Under the Veterans'** Emergency Housing Order I, issued by CPA (THE IRON AGE, Mar. 28, p. 99), an estimated $1.5 to $2 billion worth of new building, alterations and repairs was trimmed from the total of $14 billion the nation had expected to spend during 1946.

Effective immediately, with certain exceptions, government permission will be required to start any new construction or to make alterations and repairs costing more than $400 for homes (five families or less), $1000 for offices, business establishments or residential buildings of more than five families, or $15,000 for larger commercial and industrial establishments.

The order is designed to conserve enough materials to make possible the 1,200,000 housing units set by Housing Expediter Wilson W. Wyatt as the 1946 goal of his Veterans' Emergency Housing program.

This restrictive order is expected by officials to produce sufficient materials for 700,000 units of the emergency program during this year.

"Only by prohibiting the starting of less essential and deferrable projects can enough building materials be found to provide shelter for returning veterans and their families," said Mr. Wyatt and CPA Administrator John D. Small in a joint statement.

The cutback imposed by the order is expected to greatly reduce the $5 billion which the government estimates the nation had planned to spend for expansion, alteration and repair during 1946. Of this amount, it was estimated that about $900 million would have been spent by industrial and commercial firms.

Localized advisory committees operating under regional committees are being set up to screen applications for construction permits.

"Local committees are more able than Washington to determine the necessity for or the essential nature of such construction," Mr. Small said. "The applicant can still appeal to the Washington office for a review of his case if it is denied locally."

The order did not affect work which had actually been started prior to the effective date of the order, Mar. 26. Nor is further approval necessary for work authorized under PR 33.

Kinds of work that are restricted by the order are: Constructing, repairing, making additions or alterations, improving or converting structures, installing or relocating fixtures or equipment in structures which involves putting up or putting together processed material if the items are attached to the land, used as part of the structure, or attached in such a way that removal would damage the item.

Specifically exempted from the order is military construction and projects of the Veterans' Administration. An interagency committee will pass on departmental requests. Exempt from the order are projects where no change in the structure itself is involved and installation of equipment where it is not a part of the structure (as on the ground).

No authorization is required for rebuilding or repair of houses damaged by disaster such as fire or flood if cost is less than $6000. Cost limits in other types of construction, repair, alteration, or installation requiring no authorization are:

Houses or other structures (garage, etc.) on residential property, designed for five or less families, $400; hotels and other residential buildings for more than five families, $1000; commercial and service establishments such as offices, stores, gasoline stations, theaters, etc., $1000; churches, schools, charitable institutions, public buildings, etc., $1000; and factory or other industrial structure used for processing, manufacturing or assembling (including utilities, airports and refineries), $15,000. Ceiling on structures not covered in the foregoing, $200.

The order goes much further and makes it a violation for any dealer or person to sell or deliver materials which are known or suspected to be intended for work prohibited under the order.

Applications on housing jobs should be made on Form CPA-4386, filing nonfarm applications with the local FHA office and farm-housing applications with the County Agricultural Conservation Committee. Nonhousing farm jobs are filed also with the latter committee.

Applications for all other construction or repair work covered by the order should be filed with the nearest District Construction Office of the CPA.

The London ECONOMIST

Crisis Limited

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AS this article is written, the Iranian crisis is not yet over. But at least Washington and the headline writers of the press have shaken themselves out of a frenzied assumption that it is going to lead to another war in the next day or two. Of course, there are still several important problems to be solved, and, not least, the partitioning of Iranian oil in such a way as to save faces in Moscow, London, Washington—and UNO. But America does sense the passing of what it took to be a war fever. The drums are not beating the call to instant arms, and there is a perceptible tendency to just a little embarrassment over the extent of the excitement during the Ides of March.

The reasons are complicated, for there were a number of beneficiaries. The draft for military service was about to go down the drain of nonrenewal in Congress. It has been revived and might yet be extended beyond May 15. Civilians had been trying to obtain control of atomic energy. The army counter-attacked valiantly and recaptured a grip on two legs of the tripod which supports this precious and precarious object. Navy appropriations were being cut. Now they may be restored. Americans in general, religious groups in particular, wallowed in the chance to say and believe the worst about a country which most Americans appear to dislike with all the xenophobia of a traditionally isolated community which had been impinged upon by an annoying and distracting world.

Yet for all the xenophobia and all the interested stirring of troubled waters, the outside world did impinge on the American consciousness as never before. Here was a crisis at very nearly the remotest spot on this globe from the new American empire upon which, according to Admiral Halsey, the sun now never sets. If one chooses to indulge in the more sinister version of how Russians behave they picked their spot for increasing the pressure shrewdly. While they relaxed it in Manchuria and the Baltic (Bornholm) they increased it in Iran. The tactic should have produced a minimum of American reaction. A good many Americans thought so too. And yet the fact remained that America rose to a war hysteria quite as quickly as though the point of pressure had been Alaska, or Mexico.

THIS was the first crisis weathered by an America which belongs to a world organization. One of the two salient points about it is that America reacted to it, in spite of its remoteness, as a hyperconscious member of a world organization, not as a distant observer of a comfortably alien world.

The other salient point is that it put control over American foreign relations back in the hands of a sadder but stronger James F. Byrnes. At the peak of the tension, President Truman discovered the warmth of foreign relations. He had been having fun; that trip out to Fulton, Mo., with the great Winston Churchill. The small town boy had gone out into the wide world and made glittering friends. It was a big day when he could bring one of them back to the home community. For however Mr. Churchill may look in Britain since the general election, he remains a more glamorous figure in Missouri than Harry Truman. And it was fun to hear him say all the unkind things about Russia which Mr. Truman's Baptist breeding kept under careful restraint from the days of the Potsdam conference. But then, suddenly, it ceased to be fun. Apparently the Russians didn't understand that it was only playing. They began using strong language, stronger than Mr. Churchill's, and the headlines blared threats of war and the public showed signs of real fright. Mr. Truman bethought himself of a man over at the State Dept. who had counselled against the trip to Fulton and had with reluctance taken orders to "talk tough" to the Russians. Mr. Byrnes had been unpopular around the White House from the Moscow conference in December. There was substance behind the gossip that a successor was being considered, although Mr. Truman's idea of a successor may have been rather in the direction of Mr. Truman becoming his own foreign minister with Mr. Byrnes remaining as the messenger boy, if he would.

But when there was talk of Russian troops marching, not only on Iran, but also on Turkey, Mr. Truman announced in press conference that Mr. Byrnes would remain as Secretary of State. That restored full authority to Mr. Byrnes instantly, because everyone knew that he would not have remained as a messenger boy. So another chapter is finished in the diplomatic education of "Jimmy" Byrnes.

IT has been a strange education. It began in the Crimea, where Mr. Roosevelt introduced his domestic right-hand man to the mysteries of diplomacy. "Jimmy" came back with a first flush of enthusiasm for the negotiation process as the solvent for international ills, but later, under attack, veered to a feeling that Mr. Roosevelt was inclined to give in too easily to Russian demands.

His second encounter was Potsdam. He went to that with Mr. Truman on the Truman theory that "horse trading" was the key

(CONTINUED ON PAGE 130)

Steel Warehouse Inventories Down 50 Pct, Receipts Fail to Gain

Cleveland

• • • **With inventories** generally reduced to about 50 pct of prestrike levels and steadily going down, and increased wage and freight-rate absorptions bringing the need for large volume into sharpest focus, the steel warehouse outlook is far from bright, according to reliable sources here.

Receipts have not picked up since the steel strike, because steel is not coming out, and at the same time, the amount of absorption warehouses must of necessity take, despite the pass-along, has warehouse operators doing some close figuring.

As a result, some local warehouses have found that over a four-month period just ended, an unreasonble amount of such absorption applies, as a case in point, to warehouses taking in the Akron, Mansfield, Columbus and Sandusky area, with absorption of motor truck rates ranging from $4.54 to $4.94 per ton. Taking the cost of shipments to other points and spreading the cost over the total tonnage shipped, one warehouse executive found that absorption ranged from $2.49 to $3.08 per ton.

The current increase in motor truck freight rates as approved by the Interstate Commerce Commission represents an average increase of 90¢ per ton over the amount absorbed under the former rates.

Average weight of one warehouse operator's out-of-town shipments is about 1700 lb., which places him in the highest truck rate bracket. But underlying the low shipping rate average is the steel shortage, a lack of a complete range of sizes, and a conscientious effort on the part of steel warehouse operators to spread the reduced supply.

Under the fixed spread, with the increase in mill prices, warehouses in this area are absorbing $2.66 per ton when operators compare mill costs against the spread of warehouse structurals.

Companies having salesmen who work on a percentage basis are finding that their commissions have increased between 10¢ and 15¢ a ton, because commissions are figured on the new prices and are automatically more.

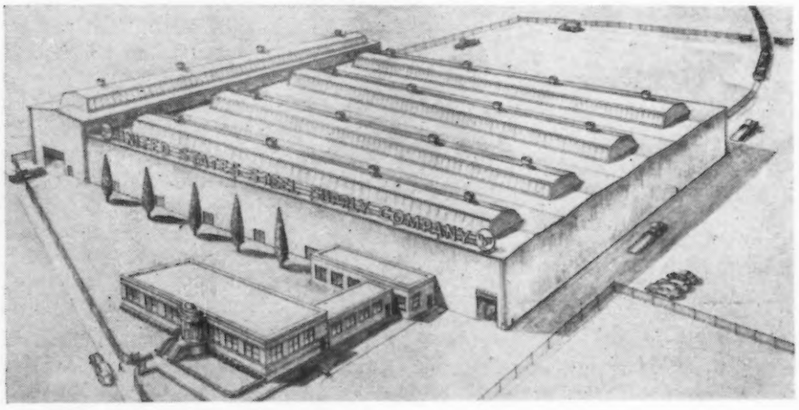
Another factor in the steel warehouse picture is the new steel wage increase, which represents about a $1.50 per ton absorption as a general rule, a situation engendered by an average 40 pct reduction in the size of warehouse orders, due to lack of popular sizes and the quota mills have put on warehouses, which is considerably below the wartime operation. Thus, costs are commensurately advanced through the necessity of filling more orders of smaller quantities.

One steel warehouse operator here, whose original program this year called for some 20,000 tons, estimated at the time the war ended, on the basis of mill quotas and a little help from surplus, will get about half that amount of steel, or closer to 45 pct of his original estimate, as matters stand now.

Indications are that very little steel has been channeled through the legitimate steel warehouses, and it is alleged by some segments of the warehouse industry that the major share of the steel surplus developed and made available to date has passed into the hands of newcomers, rather than through the established warehouse channels.

Some observers point out, however, that an anomalous situation exists in the disposal of surplus steel, since the Armed Forces may, under regulations, sell surplus steel for prices considerably below the War Assets Administration prices. While this practice undoubtedly expedited disposal, it served to keep much steel that would have otherwise been declared surplus to WAA and opened to bid, from getting into steel warehouse distribution channels, and it is not unlikely that a very considerable share of the anticipated steel surplus was disposed of in this manner.

NEW WAREHOUSE: *Sketch of the new Cleveland warehouse of United States Steel Supply Co. The plant is to be completed late in 1946. It will include about 170,000 sq ft of warehousing space. The new plant will double existing facilities of the company in Cleveland.*



Canada Increases Steel And Pig Iron Prices Effective on April 1

Toronto

• • • **Canadian iron** and steel prices for primary and secondary products were increased $5 to $6 per ton effective Apr. 1, according to announcement by Wartime Prices & Trade Board. On Feb. 14, 1942, permission was granted by the Department of Munitions & Supply whereby some Canadian producers increased prices by $5 per ton, but this did not apply to the Steel Co. of Canada for its steel distribution in the Toronto area.

In addition to the increase which went into effect the first of the month, the Steel Co. of Canada is permitted to take advantage of the 1942 advance and its new price will be on the basis of $10 per ton for this district. All companies now have the same listings with regard to steel prices.

Earlier this year it was announced that the producers had discontinued their discounts when payments were made for steel products within thirty days. With this advance, they have reverted to

Staff Changes On The Iron Age

LEFT

• R. M. Gibbs, regional Pittsburgh manager of THE IRON AGE, has been appointed assistant to the president with headquarters in the home office, 100 East 42nd St., N. Y.

RIGHT

• John M. Huggett, former Captain USMC and previously account executive with Ketchum, MacLeod and Grove, Inc., of Pittsburgh, has been appointed regional Pittsburgh manager of THE IRON AGE to succeed R. M. Gibbs.

their old practice of giving customers regular discounts.

In sales by manufacturers of products employing iron or steel, permission is granted to advance the selling price by the amount of the increased cost of any component affected by reason of the price increase, plus 25 pct of the increased cost.

In sales by distributors of iron or steel products produced in the United States, the maximum net selling price at which the importer may sell these products is increased by the difference between the current laid down cost in accordance with the maximum prices fixed by the Office of Price Administration of the United States for such product, and the maximum laid down cost similarly determined at which an identical product was or could have been imported from the same seller or class of seller in the United States on Dec. 31, 1945. If the importer sells to a person other than a manufacturer an iron or steel product made in the United States, he shall not increase his selling price except to the extent that upon application by him he is authorized to do so by the Administrator of Distributive Trades.

The lawful selling price established now for basic or primary steel products produced in Canada shall be deemed to be those in effect on Mar. 30 plus the increase set forth in the following table.

Basic or Primary Iron and Steel Products

	Increase per gross ton
Pig iron	$5.00
Ingots	5.00
Blooms, billets and slabs	6.00
Rails, heavy (over 60 lb)	4.00
Rails, light (60 lb or less)	6.00

	Cents per 100 lb
Sheet piling	.25
Structural shapes	.40
Bars, hot-rolled, carbon and alloy including bar size structurals	.20
Sheets, hot and cold-rolled including tin mill, black and blue	.25
Sheets, galvanized	.30
Wire rods, hot-rolled	.40
Grinding balls (forged steel only)	.50
Splice bars	.35
Tie plates	.35
Axles for railway rolling stock freight	.35
other	.55

Secondary Iron and Steel Products

	Increase cents per 100 lb
Wire, heavy (0.034 in. in diam. or thickness and heavier)	.50
fine (lighter than 0.034 in. in diam. or thickness)	1.00
barbed	.50
Bale ties	.50
Nails, wire	.20
cut	.75
Staples (wire all types)	.20
Rivets, small and large	.55
Spikes, drift and pressed	.55
track and shimming	.35
Bolts, track	.35
Horseshoes	1.00

	Increase in pct
Fence, all types, including welded and woven wire mesh except snow fence	12½
snow	10
gates, posts, fittings	12½
Bolts, nuts, screws, washers, burrs (all types)	12½
Cotter pins	10
Tacks, cut	10
wire	10
Horse nails	10
Calks, screw and toe	10
drive	20
Hoops, of steel sheets or wire	10
Bright goods, comprising cornice hooks, wire door pulls, gate hooks and eyes, wire hat and coat hooks, screw eyes, screw hooks, storm window eyes, stove pipe screw eyes, stove scrapers and jack chains	10

New prices effective on iron and steel products as of Apr. 1, are as follows per 100 lb:

	Price per 100 lb
Structural shapes, heavy	$3.20
Bars	3.90
Sheets, blue and black	3.05
Sheets, galvanized	4.55
Plates	2.85
Wire, heavy	3.50
Wire, fine	6.00
Wire, barbed	3.00

Pig Iron
per gross ton, delivered Toronto

	Price per gross ton
Base grade (2.25 silicon and under)	$30.50
Malleable	31.50
Basic	30.50

For each 0.25 pct increase in silicon price advances 50¢ per ton.

In approving new price regulations on iron and steel, there are exceptions made whereby the following items are excluded from price advances except under special authority by the Board: Containers of all kinds; electric or gas operated stoves, ranges, rangettes, heaters, grates, water heaters and refrigerators adapted to household use. Electrical appliances adapted to household use: food choppers and grinders, irons and ironers, washing machines, vacuum cleaners and attachments, garbage disposal units, floor waxers and polishers. Other electrical appliances: grills, waffle irons, hot plates, roasters, kettles, chafing dishes, food or drink mixers, juice extractors, coffee makers, toasters, portable humidifiers, curling irons or tongs, hair dryers, permanent waving machines with spacers, clamps, rods and heaters, razors and shavers, bottle warmers, bottle sterilizers, broilers, doughnut cookers, egg cookers, slicers and shredders, vibrators. In addition farm implements and machinery and parts, furniture of all kinds including mattresses, springs, motor vehicles and parts.

European Letter

(CONTINUED FROM PAGE 86)

tional services in addition to those already being operated to Latin-America by British South American Airways.

The main runway will, if necessary, be extended from its present length of 9000 ft to 15,000 ft, and the three runways will each be 300 ft wide and strong enough to take the heaviest aircraft yet designed, including the 120-ton Bristol Brabazon I.

Whittle Awarded Jet Prize

London

• • • **Air Commodore Frank Whittle,** Hon.M.I.Mech.E., at the annual meeting of the British Institution of Mechanical Engineers, was presented with the 1945 James Clayton Prize of $4000 for his contribution to the advancement of engineering science by invention, design and research in developing his system of jet propulsion by internal combustion.

B.I.S.F. Elects Latham

London

• • • **G. H. Latham, chairman** of the Whitehead Iron and Steel Co. Ltd., has been appointed president elect for 1947 of the British Iron & Steel Federation in succession to Ellis Hunter. Mr. Latham, who was for a time managing director of Richard Thomas & Co. Ltd., was recently elected chairman of the National Assn. for Rolled and Re-Rolled Steel Products.

Announces New War Plant Allocations

London

• • • **The allocation** of British war factories to peacetime production is continuing, and 30 new actions have recently been announced by the Board of Trade Journal. The list represents about 4½ millions sq ft of floor space, and the planned enterprises are estimated as capable of furnishing 20,000 jobs.

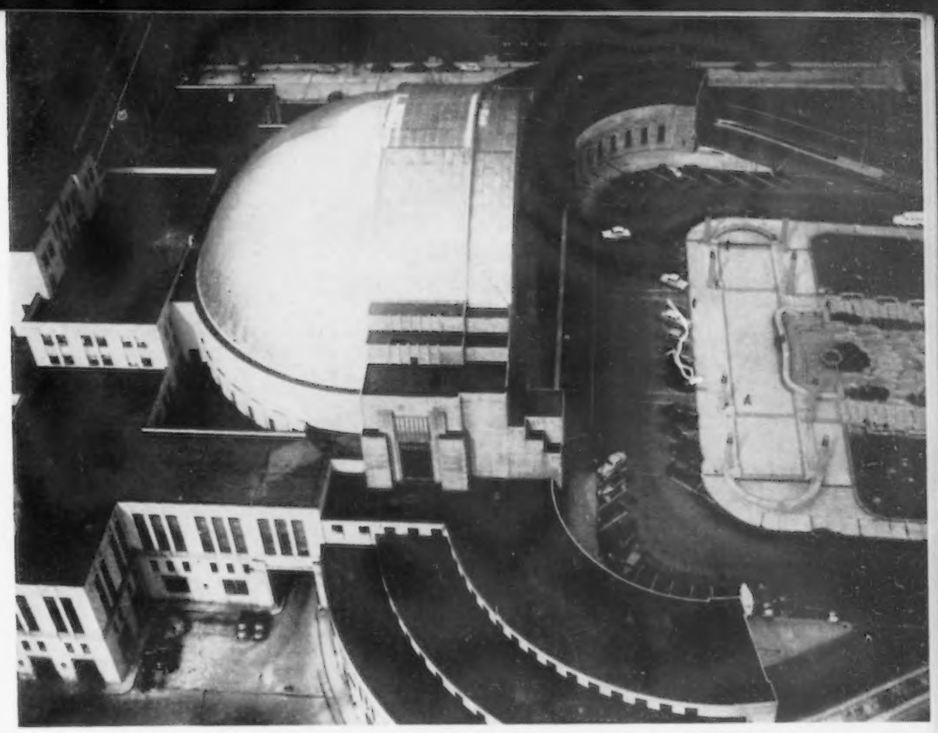
In half the plants the wartime operator remains as the holding firm, but in the others the new firm will take over when government production is in full operation.

The announcement of this list brings to 205 the total of government plants so allocated, and swells the total of floor space to about 51 million sq ft. The latest list follows:

British Government Factories Allocated to Industrial Uses

Location	Area in sq ft	Wartime Production	Allocated to	Postwar Production	Estimated No. to be Employed
Northern Region					
Jarrow	128,000	Bombs and general engineering	Baker Perkins Ltd.	Machinery for food and chemical industries.	800
Birtley	54,900	Assembly shop for vehicles	Birtley Co. Ltd.	Refrigerators	175
North Eastern Region					
Sherburn-in-Elmet	361,000	Aircraft	W. & T. Avery Ltd.	Scales	1,000
Ossett	100,000	Propellers	Philco Radio & Television Corp. of Gt. Britain Ltd.	Radio equipment	600
Sheffield 1	42,400	Aircraft engine components	Firth Vickers Stainless Steels Ltd.	Engine components	70
Sheffield 2	19,670	Bombs	Homfray & Co. Ltd.	Carpets	160
North Midlands					
Leicester	29,280	Aircraft engine components	Armstrong Siddeley Motors Ltd.	Engine development	300
Eastern Region					
Stevenage	42,360	Aircraft handling equipment	Vincent H.R.D. Co. Ltd.	Motorcycles and marine engines	360
Southern Region					
Poole	107,500	Construction and repair of small craft.	British Drug Houses Ltd.	Laboratory chemicals	700
South Western Region					
Swindon 1	226,255	Airframe components	Plessey Co. Ltd.	General manufacturing	400
Swindon 2	96,000	Naval gun mountings	Marine Mountings Ltd.	Light manufacturing	600
Atworth	40,830	Aircraft gun turrets	(a) New Mendip Engineering Co. Ltd.	Pumps	100
			(b) Murray & Baldwin (Bath) Ltd.	Sports goods	150
Salisbury 1	32,440	Piston rings	Wellworthy Piston Rings Ltd.	Piston rings	500
Salisbury 2	26,570	Machine tools	Weir Precision Engineering Co. Ltd.	Machine tools	60
Yate	26,000	Aircraft turrets	Parnall Aircraft Ltd.	Clock cases and household equipment.	100
Wales and Monmouthshire					
Beaumaris	144,550	Aircraft	Saunders Shipyard Ltd.	Sea-going craft and passenger vehicle bodies.	1,000
Abergavenny	52,000	Aircraft engine components	Coopers Mechanical Joints Ltd.	Motor car equipment	175
Midlands					
Blythe Bridge	507,242	Aircraft	Simplex Electric Co. Ltd.	Domestic electrical appliances	1,350
Wolverhampton	218,230	Carbons	General Electric Co. Ltd.	Carbons	250
Radford	212,840	Aircraft engines	Daimler Co. Ltd.	Motor car parts	750
Hereford 1	62,060	Filling factory	Harcourts Ltd.	Domestic electrical appliances	400
Hereford 2	150,000		Kingfisher Ltd.	Furniture	550
Ledbury	31,810	Aircraft components	G. Nott	Fruit juice extraction	60
Exhall	21,840	Aircraft engines	D. Hinton Ltd.	Cutting tools	130
North Western Region					
Preston	684,195	Aircraft	English Electric Co. Ltd.	Domestic applicances; traction motors, etc.	3,000
Trafford Park, Manchester	642,200	Airframe components	Metropolitan Vickers Electric Co. Ltd.	Heavy electrical machinery	3,000
Openshaw	200,025	Aircraft	Williams & Williams Ltd.	Prefabricated housing units	1,000
Crewe	200,000	Aircraft engines	County Clothes Ltd.	Outer clothing	1,200
Oldham	150,000	Aircraft carburettors	Foster & Seddon Ltd.	Diesel commercial vehicles	500
Rawtenstall	62,400	Plastic sheet	I.C.I. (Plastics) Ltd.	Perspex	450
Scotland					
Aberdeen	144,822	Aircraft	Tullos Ltd.	Agricultural machinery	1,000

Aluminum Roof Replaces Tile On Large Cincinnati Terminal



SPRING TOPPER: *Cincinnati's Union Terminal has a new spring topper, all finished in shiny aluminum. The old roof was replaced by this prefabricated aluminum roof, the job being completed in 3½ months. Alcoa furnished the aluminum and Overly Mfg. Co., Greensburg, preformed each sheet prior to its shipment and installation.*

• • •

Pittsburgh

• • • **One of the most** unusual engineering projects of the postwar period was the recent completion of the new aluminum roof for the Union Terminal, Cincinnati. The aluminum portion includes the roofing for the dome-shaped area and the two arched roofs or "barrels" covering the main body of the terminal, as well as three parapet walls extending to the front facade. A total of 32,000 sq ft of roofing was involved. The terminal, which handles about 140 regularly scheduled trains a day, was built 13 yr ago.

When it became apparent that the roofing on the dome-shaped area and "barrels" would need replacing, the Union Terminal Co.'s engineers began a study of the various available roofing materials, a study that led to the conclusion that aluminum might well provide the best solution to the problem.

A consultation was held with the architectural division of Aluminum Co. of America to determine the exact needs of the roof. Then the Overly Mfg. Co., at Greensburg, Pa,. was consulted regarding the possibilities of using its batten style aluminum roofing, known to the trade as the Goodwin batten. This type of roofing is prefabricated and simple to construct and easy to erect. Besides meeting all requirements of weather resistance and low maintenance costs, such a roof is extremely light in weight, weighing approximately 1/20 as much as the nonmetallic roof previously used on the terminal.

With the exception of the flat areas where ⅛ in. aluminum sheet was used, the entire dome-shaped roof, barrels and parapet walls were covered with 14 gage aluminum sheet of which a total of 1123 sections were used. Because of the contour of the dome-shaped area, it was necessary for each section of sheet to be tapered to insure precise fitting as the sections converged toward the top.

In addition to the preformed aluminum field sheets, approximately 11,500 ft of extruded aluminum batten and cap were used. Alcoa alloy 53S was employed for the extruded sections. The sheets were formed of Alcoa alloy 3S-½H.

Prefabrication of the aluminum sheets at the Overly plant in Greensburg considerably simplified the job of erection. Extruded battens and caps ranged from 6 ft 6 in. to 20 ft in length. In order to handle the problem of roof expansion and contraction, which is considerable in a roof of this type, it was necessary to stagger all of the joints to see that each joint on each bar was offset in order to prevent leakage.

Prior to installation of the aluminum roof, it was necessary to remove the old tile roof and to prepare the underlying structure for the new surface. The concrete forming the base for the old roofing was left in place as was the 30 lb layer of felt. Repairs to the existing felt layer were made where necessary. Over this a 1 in. layer of Armstrong cork was mopped on, followed by another layer of 30 lb felt. Over the last layer of felt a layer of 15 lb asbestos felt was placed with the outer surface dry. This 1 in. layer of cork develops approximately the same value of insulation as the previous roofing developed.

In order to anchor the aluminum sections securely in place, holes were drilled through the felt and cork and approximately 1½ in. or more into the concrete to receive the expansion shields. Each expansion shield consisted of a zinc die casting known as a "Cinch Anchor." After the holes were drilled and the expansion shields placed, they were filled with an Alumelastic caulking compound prior to placing anchor bolts. The roof plug anchor bolts were spaced at an interval of 22 in. as were the cap bolts. Slots were cut in the battens to permit sliding during expansion and contraction.

The curved shape of the roof imposed a major structural problem. Each section of aluminum bar, batten and sheet had to be precurved to a slight degree to meet the shape of the sectional arc. This preforming and curving was done in the Overly shops prior to shipment.

The aluminum sheets were placed in interlocking vertical sections with the upper sheets progressively

Industrial Briefs...

• PLANT FOR SALE—An aircraft parts plant operated by the Cleveland Graphite Bronze Co. in the manufacture of aircraft bearings and bushings has been offered for sale by War Assets Administration.

• CALIFORNIA OFFICE—Taylor-Winfield Corp., Warren, Ohio, has announced the return of W. S. Chapman to California as a direct factory representative. Mr. Chapman's office will be located in Los Angeles.

• ORGANIZES COMPANY — The Universal Helicopter Corp., Buffalo, has been organized by three aeronautical engineers formerly with the Curtiss-Wright Corp., for the purpose of manufacturing rotor blades for helicopters. The company plans to start production of parts for helicopter blades for Connecticut and New York City firms immediately. The blades, described as of an entirely new design, will be of plastic-bonded wood with a stainless steel edge.

• SYNCROMATIC PLANT — The Syncromatic Corp. of Milwaukee is completing a new plant at Watertown, Wis.

• EATON BUYS PLANT — The Eaton Mfg. Co., Cleveland, has acquired the controlling shares of the Dynamatic Corp., Kenosha, Wis. Office and shop personnel will be retained.

• UP FOR SALE—The forging plant of the Aluminum Co. of America at New Castle, Pa., is being offered for sale by the War Assets Administration. Formerly occupied by the Carnegie-Illinois Steel Corp., the plant comprises some 59 buildings ranging in age from 25 to 45 yr. Designed to produce 21,000,000 lb of aluminum forgings a year, machinery in the plant includes 27 forging presses from 700 to 2500 tons; 24 trim and blanking presses, 27 preheating ovens; 20 heat treat and aging ovens.

• BUYS PLANT—Saginaw Malleable Iron Div., General Motors Corp., has recently announced that they are completing final negotiations for the purchase of the Tilton plant, which they built and operated for DPC during the war. Substantial portions of the tools, machinery and equipment are being included in the overall purchase.

• CHANGE OF NAME—The American Gauge Co. has changed its name to the American Gage & Mfg. Co. This addition carries with it no change of personnel or location.

• TRANSFERS OFFICES — Ceco Steel Products Corp. has transferred its general offices from Omaha, Neb., to its manufacturing division plant at 5701 W. 26th St., Chicago. The plant is being enlarged by more than 50 pct, with construction expected to be completed by July. Windows, doors, screens, weatherstrips, joists, lath and other metal building products are manufactured in the plant.

• NEW CANADIAN FIRM—Announcement of the formation of the Wales-Strippit of Canada, Ltd., with plant and sales offices located at 85 Cannon St., West Hamilton, Ontario, with William Beattie as manager, has been made.

• CHANGE OF ADDRESS — Marquette Machinery Co., Detroit, announces the removal of its offices to 2406 Guardian Bldg. of the same city, where enlarged quarters will provide better facilities to handle the company's growing business.

• TO EXPAND FACILITIES—Construction has started on a new oxygen filling station and acetylene producing plant, to be located in Charlotte, N. C., the Linde Air Products Co., unit of Union Carbide & Carbon Corp., announced recently.

overlapping the ones below. The top sheet at the upper end of the battens and the caps adjoined the top section and was fabricated with a covering cap at its lower end to avoid leakage at that point. The end cap was designed to form a sleeve over the cap and batten and was welded to the base sheet.

All bolts and washers were made of aluminum, utilizing in each case the alloy best suited to meet the requirements of the job at hand.

The completed roof and parapet walls present a compact network of interlocking sliding aluminum joints capable of withstanding any conceivable amount of expansion and contraction. All parts of the roof are readily accessible in the event that emergency repairs are necessary.

Actual construction of the roof was begun on Oct. 18, 1945. The final sections of aluminum sheet were laid on Jan. 31, 1946, much of the work being accomplished under winter conditions.

National Tool's Sales Drop

Cleveland

• • • **National Tool Co.,** manufacturer of special metal cutting tools, reported that its net income for the year 1945 was $58,420 or 25.5¢ per share on the 229,524 common shares outstanding at the end of the year. The net income reported for 1944 was $115,048, which, however, included a nonrecurring credit of $40,350.85.

Net sales in 1945 amounted to $2,167,282, a decrease of 13.4 pct from the 1944 sales of $2,502,218. The decrease as reported by the company is attributable to the sudden end of the war and the strike-bound situation of customers.

Shone Is Made Secretary

London

• • • **Robert Shone,** who during the war was general director of statistics, costs and prices of the British Iron & Steel Control, has been appointed secretary of the British Iron & Steel Federation. He has twice visited America for the Ministry of Supply—the first time in connection with planning the United States control of steel distribution on the lines of the British system.

Construction Steel...

New York

• • • **Fabricated steel awards** this week included the following:

3400 Tons, Detroit, Fisher Body Div., General Motors Corp., stamping plant No. 2, to American Bridge Co., Pittsburgh.

2500 Tons, Palatka, Fla., paper mill for Hudson Pulp & Paper Corp., New York, to Southern Steel Works Co., Birmingham.

2100 Tons, Hopkins, Minn., farm machinery parts building, to American Bridge Co.

1100 Tons, Buffalo, department store addition for J. N. Adams & Co., to Bethlehem Steel Co., Bethlehem, Pa.

600 Tons, Compton, Calif., Sears, Roebuck & Co. store, through L. E. Dixon Co., to Pacific Iron & Steel Co.

450 Tons, Buffalo, L. L. Berger, Inc., department store, to Buffalo Structural Steel Corp.

400 Tons, Erie, Pa., General Electric Co., plant to Ingalls Iron Works, Verona, Pa.

400 Tons, Springfield, Mass., gas holder for Springfield Gas Light Co., to Stacey Mfg. Co.

280 Tons, Buffalo, Chevrolet Div. of General Motors, to Bethlehem Steel Co., Bethlehem, Pa.

260 Tons, North Tonawanda, N. Y., Durez Plastics, addition to R. S. McManus Steel Construction Co.

242 Tons, Los Angeles, Republic Steel Co., building and craneway, to Pacific Iron & Steel Co.

175 Tons, Chicago, West 47th St., underpass, to American Bridge Co., Pittsburgh.

160 Tons, Buffalo, Brace Mueller Huntley, Inc., steel warehouse to R. S. McManus Steel Construction Co.

• • • **Fabricated steel inquiries** this week included the following:

1100 Tons, Ecorse, Mich., maintenance shops, Great Lakes Steel Corp.

1000 Tons, Greencastle, Ind., transmission towers, Public Service Co. of Indiana.

560 Tons, Various Locations, 1946 bridge requirements, Rock Island RR.

450 Tons, Chicago, Englewood station engine house reconstruction, New York Central RR.

250 Tons, Portland, Me., state pier extension, Fay, Spofford & Thorndike, Boston, engineers.

235 Tons, Columbia Fall, Mont., warehouse building, Hungry Horse Dam, bids to U. S. Bureau of Reclamation.

225 Tons, Galesburg, Ill., Gale Mfg. Co., factory building.

200 Tons, Providence, warehouse for Associated Grocers of Rhode Island.

188 Tons, Upper Lake, Calif., bridges across Robinson Creek and Scott Creek, California Div. of Highways, Sacramento, bids due May 1.

133 Tons, Los Angeles, addition to Oxford Bldg., Southern California Telephone Co.

• • • **Reinforcing bar** awards this week included the following:

600 Tons, Compton, Calif., Sears, Roebuck & Co. store, through L. E. Dixon Co., to Bethlehem Pacific Coast Steel Corp.

350 Tons, Lansing, Mich., Michigan State College building to Capitol Steel Corp., Lansing.

335 Tons, Gary, Ind., store addition, Sears, Roebuck & Co., to Carnegie-Illinois Steel Corp., Pittsburgh.

180 Tons, Buffalo, J. N. Adam & Co., department store addition, to Bethlehem Steel Co., Bethlehem, Pa.

175 Tons, La Porte, Ind., Allis-Chalmers Mfg. Co., buildings to Ceco Steel Product Corp., Chicago.

• • • **Reinforcing bar** inquiries this week included the following:

7000 Tons, New York, J. W. Johnson Homes.

6000 Tons, New York, Brownsville housing project.

815 Tons, Friant, Calif., miscellaneous bars, Bureau of Reclamation, Denver, Inv. A-48, 764-A-1, bids due Apr. 16.

690 Tons, Odair, Wash., U. S. Bureau of Reclamation, Grand Coulee Dam.

625 Tons, Chesapeake City, Md., Chesapeake & Delaware Canal.

250 Tons, Elkins, W. Va., channel cutoff.

244 Tons, Hornell, N. Y., Almond Dam.

220 Tons, Lorain, Ohio, Baltimore & Ohio coal dock.

200 Tons, Pittsburgh, Blaw Knox Corp., project.

• • • **Sheet piling awards** this week included the following:

3175 Tons, Houghton, Mich., sheet and bearing piles and accessories, Keweenaw waterway revetment, for U. S. Engineer, Duluth, to Carnegie-Illinois Steel Corp., Chicago.

• • • **Sheet piling inquiries** this week included the following:

2200 Tons, Milwaukee, Z-piling and accessories, brewery building.

800 Tons, Memphis, U. S. Engineer inquiry for Wolf River sea wall.

3000 Tons, Brownsville, Tex., including accessories, Brownsville Navigation District, bids soon.

500 Tons, Quincy, Ill., guide walls, bids to U. S. Engineer.

500 Tons, Dubuque, Iowa, guide walls, bids to U. S. Engineer.

OPA Backers Marshal Forces to Extend Life Of Price Control Bill

Washington

• • • **A renewed battle** by proponents of unrestricted extension of OPA is in prospect when the matter is brought to the House floor for consideration early next week, probably on Monday. Bureau heads are using as a trump card the promise that if allowed to retain full wartime powers over the coming months, "by June 30, 1947, only rent controls and some last remnants of price control in isolated fields will remain."

The bill prolonging the life of the price agency was reported out of the House Banking & Currency Committee last Saturday after wide revisions which sharply curtailed the Bureau's powers. As approved by the Committee, major revisions included:

Revision of OPA's cost-absorption policy by requiring that the agency restore the retail profit margins it has trimmed from a number of reconversion items such as automobiles, refrigerators, radios, etc.

Provision for an early termination of the government's subsidy program of $2 billion annually, including payments to reduce consumer food costs.

Mandatory liquidation of price controls in various lines as the supply climbs toward demand and placing the responsibility for decontrol in the hands of the President rather than OPA.

A repeal of the maximum average price policy which was inaugurated to force manufacture of low-cost goods, particularly clothing and textiles.

Effectiveness of such a bill was indirectly challenged by five agency heads in a joint report to the White House on "hold the line" progress for the past 3 yr. It called for prompt renewal of price control legislation without "crippling amendments which are now being proposed."

Signed by Stabilization Director Bowles, Secretary of Agriculture Anderson, OPA Administrator Porter, CPA Administrator Small, and Wage Stabilization Chairman Wirtz, the report sought action on renewal before May 15 and said delay created uncertainty which hampered production but increased inflationary pressures.

Subsidies are indispensable to prevent increase in food prices, the report declared, while extension of the second war powers act is essential to prevent hoarding of materials and production bottlenecks.

People ARE Shaving

Boston

• • • **Despite OPA regulations, people are shaving. At least, that is what the Gillette Safety Razor Co. believes. Its backlog of unfilled business is so large, management still finds it necessary to allocate orders for razors and blades and most likely it will be necessary to continue to do so for a couple of months at least.**

The Boston plant is operating on two full turns, and on three turns on some operations. The company's British, Canadian, French, Rio de Janeiro and Buenos Aires subsidiaries, at last reports, were operating on a satisfactory basis, although the exchange problem is a big factor in the French plant showing.

MACHINE TOOLS

. . . News and Market Activities

Tool Makers Look for Price Change

• • • **While a shortage** of antifriction bearings and electrical equipment continues to keep machine tool production partially anaesthetized, builders and dealers alike are watchfully waiting word on price increases or complete removal of ceilings.

Reports stemming from the underground had the announcement scheduled for Friday, Apr. 5, at which time it was learned that Monday, Apr. 8, was alleged to be the day of reckoning. Further delay serves as indication to some sources in the trade that complete removal of price ceilings is not forthcoming, but an increase somewhere near parity in the current price pattern will be granted.

See p. 98; also 104 and 105 for report on Westinghouse machine tool forum.

A wide divergence of opinion and practice surrounds escalator clauses which some companies have put into effect, but which others find somewhat problematical where the customers are concerned. The multiplicity of factors affecting all industry at this time seems apparently to serve in emphasizing relatively minor matters to a point where they are completely disproportionate.

In Boston, the industry reports business as only fair at best, citing the abundance of government-owned surplus tools as a primary reason why their products are not moving faster. Another factor, builders in this area allege, is that many plants have not completed reconversion but that many have progressed far enough in this direction to make it reasonably certain they are not going to need a lot of new equipment.

On the other hand, a firm handling a miscellaneous line of tools for manufacturers is quite satisfied with business so far this year, and predicts sales for the eight months to Aug. 31 this year, if continued at the current level, will surpass total sales for all of 1945 and even 1944.

March sales top those for the corresponding month of 1945 and 1944 by a comfortable margin. This firm however, is not trying to sell surplus tools because there is no money in it and valuable time is wasted trying to locate serviceable items in the government-owned surplus.

In Cincinnati, prolongation of the electrical and ball bearing strikes is reducing machine tool output to a marked extent. Some plants are down to three days operations a week, but others have been able to get sufficient material to maintain operations. An accurate statistical picture of the effect of these strikes is difficult to make because several local plants are down through walkouts of their own employees. By and large, however, an estimate of about 20 pct reduction in production because of inability to obtain electrical equipment and bearings exclusive of the plants directly strike-bound would approximate the situation. Some relief has been afforded in recent weeks by settlement at the General Electric Co., although builders indicate that the amount of equipment coming through is still little more than a trickle.

In Chicago, while the full force of surplus machine tools in government hands has yet to hit the market, they are casting a definite shadow over the used machinery trade. A strong financial position, however, is weaning many normal customers from used tools to new equipment. This narrows the confines of the potential used equipment market considerably with emergency tooling programs providing only a partial sop.

The dealers are able to provide tool locating service on the government program, but most buyers still are dealing directly with Uncle Sam.

Distributors of new standard tools, as expected, are hard hit by government surplus sales, but numerous new tooling programs, particularly in the farm equipment and railroad fields, are providing a welcome cushion.

In Cleveland, some builders report that production has been curtailed as much as 40 pct by the oft-mentioned shortages of bearings and electrical equipment. One producer got out only 45 units of a projected 75-unit schedule. On the other hand, another builder reports that he was able to get out 100 machines last month and while considerably less than he had hoped, was none the less better than nothing. No improvement in the short-supply item situation seems imminent in the Cleveland area and most builders are scheduled for another month's carefully curtailed production.

Dealers report that spotty conditions are the order of the day, and that their dealings with the War Assets Administration grow progressively worse. Shipments have picked up to some degree, but orders have fallen off, although there is a demand for some types. Price increases will certainly help in some cases at least, because at present prices large volume business would mean that some builders would simply lose their shirts.

Competent observers indicate that in a number of spot sales recently certain irregularities such as the removal of price tags go unnoticed by local officials. Others allege that at least one sale held recently nothing was shown to dealers that indicated any need for a spot sale and that it would have been better to have opened some of the plants for the so-called plant-site sale.

■

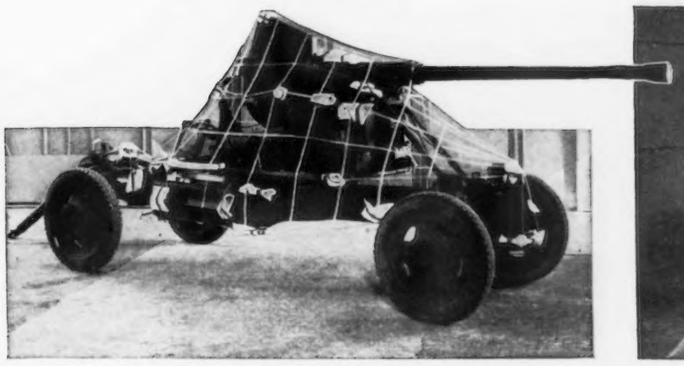
No Change in Personnel

Boston

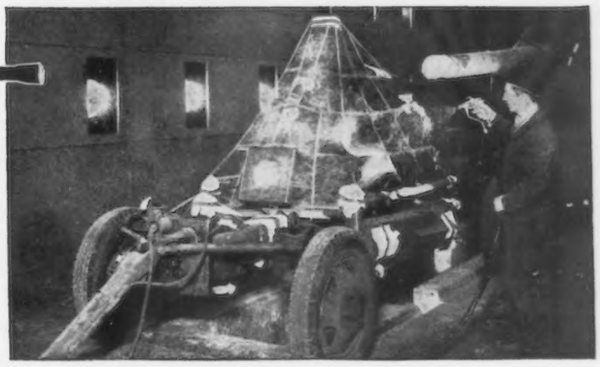
• • • **James Y. Scott,** president of the Van Norman Co., Springfield, Mass., in connection with its acquisition of Morse Twist Drill & Machine Co., New Bedford, Mass. says William T. Reid, who served as president and treasurer of the drill company will remain with it as a director and management adviser and that it is intended to leave the personnel of the company as is. No radical changes are contemplated in operation of the New Bedford company.

You've heard so much of plastic miracles

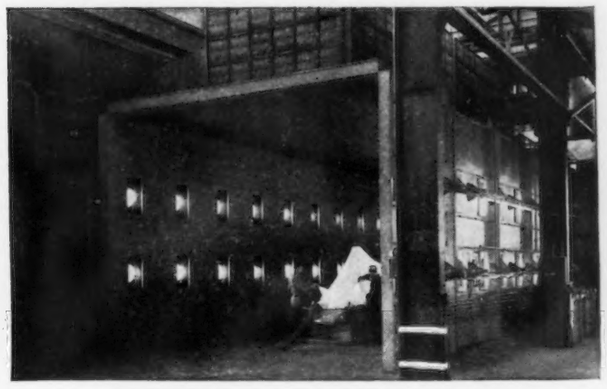
NOW MEET ONE!



1 Narrow tape is laid crisscross touching only projections of gun previously padded. Here's how Army and Navy start preparing ordnance for *safe* storage.



2 Special plastic material sprayed from DeVilbiss guns miraculously fills open spaces with gossamer cobwebs, bridging gaps of up to 16 inches.



3 Finish of webbing operation in modern, 60-foot DeVilbiss Spray Booth. Next spray guns apply three finish coats of a more liquid plastic.

Photos taken at Army's Erie Ordnance Depot.

4 Moisture-proof plastic "cocoon" completed, guns are safe for years—even in open. At any time film can be stripped off in two minutes.

HERE'S one plastic miracle that would be impossible without modern spray equipment, development of which has been so largely a DeVilbiss achievement. And at Erie Ordnance Depot, where much of the Army's materiel is being prepared for retirement, you find the time-honored DeVilbiss name on all such equipment. Even to the 60-foot spray booths which so efficiently exhaust spray vapors and ventilate the working areas!

For unusual jobs like this or the conventional, *you* can always trust DeVilbiss Leadership to provide the complete spray system that will save you the most in time and money. And deliver the best results!

THE DEVILBISS COMPANY • TOLEDO 1, OHIO
Canadian Plant: WINDSOR, ONTARIO

DE VILBISS

means **Quality** *in all four . .*

SPRAY EQUIPMENT
EXHAUST SYSTEMS
AIR COMPRESSORS
HOSE & CONNECTIONS

NONFERROUS METALS

. . . News and Market Activities

Canadian Producers Under Pressure For Increased Shipments

Toronto

• • • **With the base** metals supply growing more serious throughout the world, greater call is being made upon Canadian producers to increase output. Lead and copper are the most critical with regard to supply, while zinc is not so tight although demand is brisk. The United States and Great Britain are making pressing demands on Canadian producers for increased deliveries of copper and lead. Canadian interests that were worried about markets for their base metals less than a year ago now are concerned about satisfying domestic and export users.

Great Britain, which a year ago informed Canadian copper producers that it would require no copper from Canada this year, now is asking producers here for all the copper that can be spared, and asked for delivery of 30,000 tons during the first half of this year.

Lead supply is tight and there is little hope of meeting all requirements of consuming interests this year. Insofar as lead is concerned, Consolidated Mining & Smelting Co., is about the only producer in Canada, and the fact that few new lead discoveries have been made in recent years, it is possible that output from Canadian mines will show a decline over the next few years.

See P. 100 for report on Navy Recovery of aluminum from aircraft.

United Kingdom Reports on Metals

London

• • • **The British** Ministry of Supply and Aircraft Production has released wartime statistics on the consumption of nonferrous metals by the United Kingdom, and stocks during the war. The compilations and details are shown below.

United Kingdom Stocks of Nonferrous Metals at End of Period, In Thousands of Gross Tons

	Copper	Zinc	Zinc Concentrates	Lead	Tin	Bauxite	Alumina
1939	.....	.....	.....	.....	13.2	.....	.....
1940	134.4	84.9	.....	149.7	17.1	194.4	42.50
1941	160.7	104.8	215	80.6	24.1	117.1	62.05
1942	114.9	132.2	172	85.8	23.3	38.4	31.75
1943	169.4	165.0	102	121.0	29.9	101.6	22.24

Production and Consumption of Nonferrous Metals Monthly Averages, In Thousands of Gross Tons

	Production			Consumption		
	Aluminum	Magnesium	Aluminum	Magnesium	Bauxite	Alumina
1935	1.25	0.07	2.8	....	....	....
1936	1.33	0.13	3.2	....	....	....
1937	1.58	0.17	3.3	....	....	....
1938	1.92	0.25	3.7	....	....	....
1939	2.08	0.42	6.5	....	....	....
1940	1.58	0.51	8.5	0.67	....	3.89
1941	1.89	0.91	9.7	1.15	13.7	3.97
1942	3.90	1.51	16.3	1.73	14.0	7.72
1943	4.64	1.93	17.3	3.01	18.8	9.53
1944	2.96	1.51	12.5	3.01	17.9	6.40
1945	2.68	0.57	8.3	0.72	12.8	6.04

Consumption of Nonferrous Metals by United Kingdom In Thousands of Gross Tons

	Copper	Zinc	Zinc Concentrates	Lead	Tin
1935	20.0	17.0	10.5	29.2	1.79
1936	21.5	17.3	13.4	29.5	1.82
1937	25.1	17.4	13.2	28.8	2.16
1938	21.5	15.4	11.8	27.0	1.52
1939	24.4	18.6	13.4	28.0	2.27
1940	37.2	21.7	12.9	21.1	2.65
1941	37.5	21.0	14.9	17.9	2.93
1942	40.9	20.6	15.5	20.5	2.24
1943	36.9	18.8	14.6	17.7	1.47
1944	29.0	15.4	14.7	18.4	1.54
1945	24.1	14.4	13.0	19.7	1.41

Wartime Tin Statistics Given by World Group

New York

• • • **The International Tin** Research & Development Council at the Hague has released its first postwar statistical report on prices, production and consumption of world tin.

World tin production reached its peak in 1941 at 245,500 long tons, as compared with the highest prewar production in 1937 of 209,100 tons.

Production statistics are as follows:

1944	1943	1942
109,000	121,500	125,000
1941	1940	1939
245,500	235,000	183,500

Consumption by the U. S. and England in long tons follows:

	U. S.	England
1945*	70,315	27,279
1944	65,000	18,435
1943	56,000	17,631
1942	60,000	23,478
1941	100,870	30,000
1940	75,000	29,225
1939	70,315	27,279

* U. S. consumption during 1945 represents a 6-month period, England's a 9-month period.

Export quotas under the International Tin Control averaged 74 pct in 1939, 115 pct in 1940, 130 pct in 1941 and 105 pct from Jan. 1, 1942.

Tin prices fixed in the U. S. at 52¢ per lb are compared with the following British average yearly prices in £ per long ton:

1939	1940	1941	1942	1943
226.3	256.6	261.7	275.0	275.0
1944	1945			
300.0	300.0			

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, del'd (Min. 10,000 lb)	15.00
Aluminum pig	14.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be	$14.75
Beryllium aluminum, 5% Be; dollars per lb. contained Be	$30.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$ 2.25
Iridium, dollars per troy oz.	$90-$100
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$104 to $109
Nickel, electro	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per oz.	$35.00
Silver, New York, cents per oz.	70.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65
Zirconium copper, 6 pct Zr, per lb contained Zr	6.00

Remelted Metals

(Cents per lb)

Aluminum, No. 12 Fdy. (No. 2)	10.00 to 10.50
Aluminum, deoxidizing No. 2, 3, 4	8.25 to 10.50
Brass ingot	
85-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb)

	Extruded Shapes	Rods	Sheets
Copper	20.87	....	20.87
Copper, H.R.	....	17.37	....
Copper drawn	....	18.37	....
Low brass, 80%	....	20.40	20.15
High brass	....	....	19.48
Red brass, 85%	....	20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	....	15.01	....
Commercial bronze, 90%	....	21.32	21.07
Commercial bronze, 95%	....	21.53	21.28
Manganese bronze	24.00	....	28.00
Phos. bronze, A, B, 5%	....	36.50	36.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculoy, Olympic or equal	....	25.50	26.00
Nickel silver, 5%	....	28.75	26.50
Architect bronze	19.12	....	....

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Tubing: 2 in. OD by 0.065 in. wall: 2S-½H, 40¢; 52S-O, 61¢; 24S-T, 67.5¢; base, 2000 to 4999 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 22.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 29.5¢; base, 30,000 lb and over.

Flat Sheet: 0.136 in. thickness: 2S, 3S, 22.7¢; 52S, 26.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 31.7¢; base, 30,000 lb and over.

Extruded Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 2S, 3S, 25.5¢; 17S, 31¢; 24S, 34¢; 53S, 28¢; 61S, 28.5¢; 63S, 26.5¢; 75S, 39¢; base 2000 to 5000 lb.

Wire, Rod and Bar—screw machine stock, rounds, 11S-T3, 17S-T, ¼ in., 28.5¢; ½ in., 26¢; 1 in., 24.5¢; 2 in., 23¢; hexagons, ¼ in., 34.5¢; ½ in., 28.5¢; 1 in., 2 in., 25.5¢; base 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam., rolled, 23.5¢; cold-finished, 24¢; base 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 37.5¢; B & S gage 23: 2S, 3S, 41.5¢; 56S, 44.5¢; 10,000 lb base; B & S gage 00-1: 2S, 3S, 21¢; 56S, 29¢; B & S 15-16: 2S, 3S, 32.5¢; 56S, 36.5¢; base 30,000 lb.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 35 to 90 lb., 56c.; less than 25 lb., 66c.

NONFERROUS SCRAP METAL QUOTATIONS

†*(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality quantity and special preparation premiums—other prices are current quotations)*

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	3.00*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.00
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.00
Automobile radiators	7.25
Zincy bronze borings	7.00
Zincy bronze solids	8.00

OPA Group 3

Fired rifle shells	8.00
Brass pipe	7.25
Old rolled brass	6.75
Admiralty condenser tubes	7.25
Muntz metal condenser tubes	6.75
Plated brass sheet, pipe reflectors	6.25
Manganese bronze solids	5.50[1]
Manganese bronze solids	4.50[2]
Manganese bronze borings	4.00[1]

OPA Group 4

Refinery brass	4.50*

*Price varies with analysis, [1] Lead content 0.00 to 0.40 pct. [2] Lead content 0.41 to 1.00 pct.

Brass Mill Scrap†

Briquetted cartridge brass turnings	8.625
Cartridge brass turnings, loose	7.875
Loose yellow brass trimmings	7.875

Aluminum*

Plant scrap, segregated

2S solids	8.50 to 9.00
Dural alloys, solids 14, 17, 18, 24S, 25S	5.00 to 5.50
turnings, dry basis	3.50 to 4.00
Low copper alloys 51, 52, 61, 63S solids	7.00 to 8.00
turnings, dry basis	5.00 to 6.50

Plant scrap, mixed

Solids	5.25
Turnings, dry basis	4.00

Obsolete scrap

Pure cable	8.00
Old sheet and utensils	7.50
Old castings and forgings	6.00
Pistons, free of struts	5.00
Pistons, with struts	4.50
Old alloy sheet	3.00 to 4.00

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	6.50
Engravers, lithographers plates	6.50
Old zinc scrap	4.75
Unsweated zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.40
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ½%, 33¢ per lb.; 90 to 98% Ni, 22¢ per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point in 500 lb. lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	25½
Electrodeposited	18⅞
Rolled, oval, straight	19⅝
Curved	20⅛
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	23⅛
Zinc, cast, 99.99, 15 in or longer	16¼
Nickel, 99 pct plus, frt. allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 100 oz. lots, per oz.	80¾

Chemicals

(Cents per lb., f.o.b. shipping point)

Copper cyanide, 1-5 bbls.	34.00
Copper sulphate, 99.5, crystals, bbls.	7.75
Nickel salts, single, 425 lb. bbls., frt. allowed	13.50
Silver Cyanide, 100 oz. lots, per oz.	0.655
Sodium cyanide, 96 pct, domestic, 100 lb. drums	15.00
Zinc cyanide, 100 lb. drums	33.00
Zinc sulphate, 89 pct, crystals, bbls., frt. allowed	6.35

SCRAP

Demand Up as Pig Iron Production Drops

New York

• • • **With the coal strike** now more than a week old, there is no effect noted as yet on the mill demand for scrap throughout the country. This unabated demand has resulted, in some areas, in truck shipments in order to keep mills in operation.

Cast grades are particularly in heavy demand—and very short supply. Moreover, this tight situation is further aggravated by the reduction in pig iron production caused by the coal strike.

Prices continue to hold firm at ceiling or close to ceiling levels, with no price changes reported during the past week.

Washington

• • • **OPA will not increase** the spread in the range of prices for unprepared and prepared scrap.

This information has been learned from reliable sources. It came on the heels of reports that the pricing agency was contemplating increasing the preparation charge of $3.50, the maximum figure that mills can pay under the ceiling for prepared scrap.

Dealers are said to have suggested an increase in the spread and the matter was discussed with consumers and later with OPA. However, after the various phases of the subject were passed upon it was decided to abandon the proposal.

•

PITTSBURGH—While tonnages of scrap from Detroit coming into Pittsburgh are not great, there have been some shipments from Chrysler and Ford, and it is expected that in about two months these tonnages will increase substantially. Turnings are extremely short, with consumers not getting as much as they desire. One mill has eliminated commissions and springboards on low phos in this area, not preferring to stock high-cost scrap in the face of the coal strike. None of the plants have cut scrap requirements because of the coal strike, and incoming scrap has been considered by the mills as quite adequate.

•

CHICAGO—Shipments to mills have shown some pickup but supply continues far short of demand. Operations of scrap producers are still curtailed because of steel shortage and industrial material is slow in coming out. Remote shipments are heavy and account for a substantial portion of the total. Although mills would like to have increased tonnages because of the coal strike, there is no way of filling this demand.

•

PHILADELPHIA—Steel scrap supply is somewhat easier here since shipments to the West have been stopped now that all local mills are in production. Pittsburgh continues to call for scrap shipments however. Meanwhile, cast continues to be seriously short with foundries paying high transportation charges. The probable effect of the coal shortage in reducing pig iron production will be to aggravate this position. Some mills have observed copper in scrap shipments and are keeping a sharp lookout for the impurity. There is some pressure by dealers for a larger spread between prepared and unprepared than the present $3.50 which, it is said, does not provide a margin sufficient for dealers to compete with mills in transportation and preparation of unprepared scrap.

•

DETROIT—The situation was unchanged this week in the Detroit market. No effect on mill demand has yet been noted as a result of the coal strike. Nor has supply from local factory sources increased significantly in the wake of settlement of the various automotive strikes, particularly the General Motors tieup.

•

BOSTON—Coal strike notwithstanding, steel mills will buy anything they can get their hands on. As a result, movement to consuming points is of fairly sizable proportions, although some shippers claim scarcity of empty cars is a detrimental factor. Supplies of borings and turnings are slowly contracting as more and more metalworking plants adopt a 40-hr week. Truck shipments of cast and low phos to foundries are fair. Melters could use a lot more, however.

•

NEW YORK—The scrap situation remains unchanged this week in this area. Scrap production is still far from adequate to meet the heavy demand which exists for all grades. Prices continue firm at ceiling. No effects resulting from the coal strike have yet been felt, although a long strike will create further hardships in that operations of scrap-producing plants may have to be curtailed.

•

BUFFALO—Hopes of consumers for a surge of scrap from the upper lakes with the opening of navigation were given a jolt when the Str. Venus, first boat into port, arrived with less than 1000 tons from Detroit. The ship's capacity is about 5000 tons. A strike involving the dock where the vessel loaded probably held down the cargo, but it is noted that shipments via rail from the Michigan industrial areas to local mills recently have been extremely light. The Venus, however, is scheduled to pick up a full load of scrap at Duluth late this week. The coal strike has had no effect on the market here to date, but a letdown in mill operations is expected by the end of the week unless a settlement is reached.

•

ST. LOUIS—The flow of scrap iron to the St. Louis industrial district continues to improve, with much warmer weather prevailing. The labor situation also has improved. Shipments are expected to increase as users of steel step up their production. The railroad movement also is expected to increase as they get materials with which to operate.

•

CINCINNATI—Many consumers of scrap iron and steel in this area are receiving much less than amounts needed to continue production, since the flow of scrap into the market fails to keep abreast of demand. With industrial scrap definitely off, and ordinary collection hampered by lack of sufficient truckers, dealers indicate the market continuing very tight. Truck shipments are being made from time to time to maintain operations in local plants, and brokers and dealers are resorting to an allotment system in order to keep consumers supplied. Prices hold at ceiling.

•

CLEVELAND—Demand continues to exceed supply, particularly cast iron, with all grades continuing to bring ceiling prices. Railroad lists closed last week, and while more of a tonnage was available than in March, the movement to bring in farm scrap, including cast, is underway. Shells, without bands, are being offered by one of the southern districts at $16.50 (low phos) plus about $7.62 freight, but with the frequent factor of excess freight in 75,000-lb car lots, delivered price here is in the neighborhood of $24.32, high enough to keep it out of the local market.

•

BIRMINGHAM—With steel operations in this area at a high level despite the coal strike, mills are still taking all the scrap they can obtain. Turnings are very tight for electric alloy furnace use and no relief is in sight until auto manufacturers get back into full production. Few No. 2 black bundles are being offered due to scarcity of baling stock.

•

TORONTO—While Canadian steel prices were increased at the beginning of this month, no revision in ceiling prices has been made in scrap iron and steel materials. However, with all materials in short supply, transactions are being made at ceiling tops and consumers are not contesting prices. With pig iron supply becoming more acute daily, demand for scrap is gaining in volume, and an already short supply is being further aggravated. Dealers report slow but steady improvement in receipts, but incoming scrap is below 50 pct of actual requirements.

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Where asterisks are used on quotations below, this indicates a ceiling price to which must be added brokerage fee and adjusted freight.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bdld. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	15.00*
Short shov. turn.	17.00*
Mixed bor. and turn.	15.00*
Cast iron borings	16.00*
Hvy. break cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	13.75*
Short shovels, turn.	15.75*
Cast iron borings	14.75*
Mix. borings & turn.	13.75*
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Angles & splice bars	22.25*
Locomotive tires, cut	24.25*
Cut bolsters & side frames	22.25*
Standard stl. car axles	25.75*
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast	20.00*
Rails 3 ft. and under	22.25*
No. 1 agricul. cast	20.00*
Hvy. breakable cast	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	$10.50 to 11.00
Shoveling turn.	12.50 to 13.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn.	11.50 to 12.00
Low phos. plate	22.00*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Stove plate	19.00*
Scrap rails	21.00*

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$15.05*
No. 2 hvy. melting	15.05*
No. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shovelings	12.05*
Machine shop turn.	10.05*
Mixed bor. & turn.	10.05*
Cl'n cast, chem. bor.	$13.06 to 14.15*

Truck delivery to foundry

Machinery cast	21.00 to 23.51*
Breakable cast	21.57 to 21.87*
Stove plate	20.00 to 23.51*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	12.32*
Short shov. turn.	14.32*
Cast iron borings	13.32*
Mixed bor. & turn.	12.32*
Low phos. plate	19.32*
No. 1 cupola cast	20.00*
Charging box cast	19.00*
Hvy. breakable cast	16.50*
Stove plate	19.00*
Automotive cast	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	14.75*
Mixed bor. & turn.	13.75*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Cast, charging box	19.00*
Hvy. axle forge turn.	18.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting	$17.50*
Bundled sheets	17.50*
Mach. shop turn.	12.50*
Locomotive tires, uncut.	$18.50 to 19.00
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft. and under	21.50*
RR. springs	22.00*
Steel car axles	24.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 mach'ery cast	20.00*
Breakable cast	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	12.00*
Shoveling turnings	14.00*
Cast iron borings	13.00*
Bar crops and plate	$18.50 to 19.50*
Structural and plate	18.50 to 19.50*
No. 1 cast	20.00*
Stove plate	19.00*
Steel axles	18.50*
Scrap rails	18.50
Rerolling rails	20.50*
Angles & splice bars	20.50 to 21.00
Rails 3 ft. & under	21.00*
Cast iron carwheels	17.50 to 18.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	15.00*
Short shovel. turn.	17.00*
Cast iron borings	16.00*

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*
Shoveling turn.	12.33*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Charging box cast	19.00*
Store plate	19.00*
Clean auto cast	20.00*
Unstrip. motor blks.	17.50*
Cl'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shoveling turn.	16.25*
Cast iron borings	14.25*
Cast iron borings	15.25*
Mixed bor. & turn.	14.25*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00
No. 2 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel.	16.50*
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting	$15.00 to 15.75
No. 1 hvy. melting	15.00 to 15.75
No. 2 hvy. melting	14.00 to 14.75
No. 2 bales	13.00 to 13.75
No. 3 bales	7.50 to 8.25
Mach. shop turn.	6.50 to 7.25
Elec. furn. 1 ft. und.	16.50 to 17.00
No. 1 cupola cast	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$14.50 to $15.25
No. 2 hvy. melting	13.50 to 14.25
No. 1 bales	13.50 to 14.25
No. 2 bales	12.50 to 13.25
No. 3 bales	8.00 to 9.00
Mach. shop turn.	6.00
No. 1 cupola cast	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting	$12.50
No. 1 & No. 2 hvy. melting	12.50
Elec. furn. 1 ft. und.	$14.00 to 15.00
No. 1 cupola cast	20.00*

HAMILTON, ONT.

Per gross ton delivered to consumer:

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

Comparison of Prices . .

[Advances over past week in Heavy Type; declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.]

Flat-Rolled Steel (cents per pound)	Apr. 9, 1946	Apr. 2, 1946	Mar. 5, 1946	Apr. 10, 1945
Hot-rolled sheets	2.425	2.425	2.425	2.20
Cold-rolled sheets	3.275	3.275	3.275	3.05
Galvanized sheets (24 ga.)	4.05	4.05	4.05	3.65
Hot-rolled strip				
6 in. and under	2.45	2.45	2.45	2.10
Over 6 in.	2.35	2.35	2.35	2.10
Cold-rolled strip	3.05	3.05	3.05	2.80
Plates	2.50	2.50	2.50	2.20
Plates, wrought iron	4.112	4.112	4.112	3.80
Stain's c-r strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.25	$5.25	$5.25	$5.00
Tinplate, electro (0.50 lb)	4.75	4.75	4.75	4.50
Special coated mfg. ternes	4.55	4.55	4.55	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.50	2.50	2.50	2.15
Cold-finished bars	3.10	3.10	3.10	2.65
Alloy bars	2.808	2.808	2.808	2.70
Structural shapes	2.35	2.35	2.35	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.76	4.76	4.76	4.40
Wire and Wire Products: (cents per pound)				
Bright wire	3.05	3.05	3.05	2.60
Wire nails	3.25	3.25	3.25	2.80
Rails: (dollars per net ton)				
Heavy rails	$43.39	$43.39	$43.39	$43.00
Light rails	49.18	49.18	49.18	43.00
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$39.00	$39.00	$39.00	$34.00
Sheet bars	38.00	38.00	38.00	34.00
Slabs, rerolling	39.00	39.00	39.00	34.00
Forging billets	47.00	47.00	47.00	40.00
Alloy blooms, billets, slabs	56.16	56.16	56.16	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.30	2.30	2.30	2.00
Skelp	2.05	2.05	2.05	1.90

Pig Iron: (per gross ton)	Apr. 9, 1946	Apr. 2, 1946	Mar. 5, 1946	Apr. 10, 1945
No. 2 foundry, Phila.	$28.34	$28.34	$27.59	$26.84
No. 2, Valley furnace	26.50	26.50	25.75	25.00
No. 2, Southern, Cin'ti.	26.94	26.94	26.19	25.44
No. 2, Birmingham	22.88	22.88	22.13	21.38
No. 2 foundry, Chicago†	26.50	26.50	25.75	25.00
Basic, del'd eastern Pa.	27.84	27.84	27.09	26.34
Basic, Valley furnace	26.00	26.00	25.25	24.50
Malleable, Chicago†	26.50	26.50	25.75	25.00
Malleable, Valley	26.50	26.50	25.75	25.00
L. S. charcoal, Chicago	42.34	42.34	42.34	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	**18.75**	**18.75**	**18.75**	**18.75**
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.32
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$7.50	$7.50	$7.50	$7.00
Foundry coke, prompt	9.00	9.00	9.00	8.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin, Straits, New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Note: Increased steel prices announced Mar. 1 are retroactive to Feb. 15.

Composite Prices . .

[Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.]

	FINISHED STEEL	PIG IRON	SCRAP STEEL
April 9, 1946	2.69516¢ per lb.	$26.12 per gross ton	$19.17 per gross ton
One week ago	2.69516¢ per lb.	$26.12 per gross ton	$19.17 per gross ton
One month ago	2.69516¢ per lb.	$25.37 per gross ton	$19.17 per gross ton
One year ago	2.42471¢ per lb.	$24.61 per gross ton	$19.17 per gross ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1946	2.69516¢ Feb. 19	2.44104¢ Jan. 1	$26.12 Mar. 19	$25.37 Jan. 1	$19.17	$19.17
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	$19.17 Jan. 2	$18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

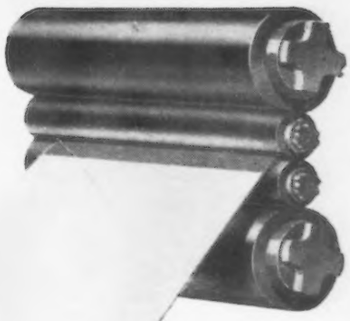
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

For Greater Strength with Reduced Weight

J&L OTISCOLOY

SHEETS · PLATES



J&L STEEL

The inherent strength of Otiscoloy is obtained without mechanical working or heat treating, which gives it exceptional weldability and formability for a high-tensile steel. It is being used successfully to reduce dead-weight and increase pay load in railroad freight cars, in trucks, buses, mine cars and other equipment. Otiscoloy is also resistant to abrasion and corrosion. Our metallurgical engineers will be glad to discuss the application of Otiscoloy to your production problems. Write for further information.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PA.

Iron and Steel Prices...

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) applies to certain width and length limitations (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15¢ per lb higher.

Basing Points	Pitts-burgh	Chicago	Gary	Cleve-land	Birm-ingham	Buffalo	Youngs-town	Spar-rows Point	Granite City	Middle-town, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO Detroit	New York	Phila-delphia
INGOTS															
Carbon, rerolling	($33.00 f. o. b. mill)														
Carbon, forging	$38	$38	$38	$38	$38	$38	$38								
Alloy	$46.80	$46.80				$46.80	(Bethlehem, Massillon, Canton, Coatesville=$46.80)								
BILLETS, BLOOMS, SLABS							(Provo=$50.20, Duluth=$41[14])								
Carbon, rerolling	$39	$39	$39	$39	$39	$39	$39	$39				$.1[14]	$41		
							(Provo=$59.20, Duluth=$49[14])								
Carbon, forging billets	$47	$47	$47	$47	$47	$47	$47					$59[14]	$49		
Alloy	$56.16	$56.16				$56.16	(Bethlehem, Massillon, Canton=$56.16)						$61		
SHEET BARS	$38	$38		$38		$38	$38	$38	(Canton=$38)						
PIPE SKELP	2.05¢	2.05¢					2.05¢	2.05¢	(Coatesville=2.05¢)						
WIRE RODS [15]															
No. 5 to 9/32 in.	2.30¢	2.30¢		2.30¢	2.30¢	(Worcester=2.40¢)					2.55¢	2.80¢			
SHEETS															
Hot-rolled	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.525¢	2.425¢		2.975¢	2.525¢	2.665¢	2.595¢
Cold-rolled[1]	3.275¢	3.275¢	3.275¢	3.275¢		3.275¢	3.275¢		3.375¢	3.275¢		3.925¢	3.375¢	3.615¢	3.595¢
Galvanized (24 gage)	4.05¢	4.05¢	4.05¢		4.05¢	4.05¢	4.05¢	4.05¢	4.15¢	4.05¢		4.60¢		4.29¢	4.22¢
Enameling (20 gage)	3.80¢	3.80¢	3.80¢	3.80¢			3.80¢		3.90¢	3.80¢		4.45¢	3.90¢	4.16¢	4.12¢
Long ternes[2]	4.05¢	4.05¢	4.05¢									4.80¢		4.41¢	4.37¢
STRIP															
Hot-rolled[3] 6 in. and under	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢		2.45¢			2.45¢		3.10¢	2.55¢	2.81¢	2.77¢
Hot-rolled[3] over 6 in.	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢		2.35¢			2.35¢		3.00¢	2.45¢	2.71¢	2.67¢
Cold-rolled[4]	3.05¢	3.15¢		3.05¢			3.05¢	(Worcester=3.25¢)					3.15¢	3.41¢	3.37¢
Cooperage stock	2.55¢	2.55¢			2.55¢		2.55¢							2.91¢	
Commodity cold-rolled	3.20¢	3.30¢		3.20¢			3.20¢	(Worcester=3.60¢)					3.30¢	3.56¢	
TINPLATE															
Standard cokes, base box	$5.25	$5.25	$5.25		$5.35			$5.35	$5.35					$5.60[11]	$5.53[11]
Electro, box 0.25 lb	$4.60	$4.60	$4.60					$4.70							
Electro, box 0.50 lb	$4.75	$4.75	$4.75					$4.85	$4.85						
Electro, box 0.75 lb	$4.90		$4.90					$5.00	$5.00						
BLACKPLATE															
29 gage[5]	3.30¢	3.30¢	3.30¢					3.40¢	3.40¢			4.30¢			3.57¢
TERNES, MFG.															
Special coated, base box	$4.55	$4.55	$4.55					$4.65	$4.65						
BARS								(Duluth=2.60¢)							
Carbon steel	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	(Provo, Utah=3.20¢)			2.85¢	3.15¢	2.60¢	2.84¢	2.82¢
Rail steel[6]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢					2.85¢	3.15¢			
Reinforcing (billet)[7]	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢			2.70¢	2.75¢	2.45¢	2.59¢	2.67¢
Reinforcing (rail)[7]	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢				2.70¢	2.75¢	2.45¢		2.57¢
Cold-finished[8]	3.10¢	3.10¢	3.10¢	3.10¢		3.10¢		(Detroit=3.15¢)		(Toledo=3.25¢)				3.44¢	3.42¢
Alloy, hot-rolled	2.808¢	2.808¢				2.808¢	2.808¢	(Bethlehem, Massillon, Canton=2.808¢)					2.908¢		
Alloy, cold-drawn	3.484¢	3.484¢	3.484¢	3.484¢		3.484¢							3.584¢		
PLATE								(Coatesville and Claymont=2.50¢, Provo, Utah=3.20¢)							
Carbon steel[13]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢			2.85¢	3.05¢	2.72¢	2.69¢	2.55¢
Floor plates	3.75¢	3.75¢									4.10¢	4.40¢		4.11¢	4.07¢
Alloy	3.64¢	3.64¢			(Coatesville=3.64¢)						4.108¢	4.316¢		3.64¢	3.73¢
SHAPES															
Structural	2.35¢	2.35¢	2.35¢		2.35¢	2.35¢	(Bethlehem=2.35¢)				2.60¢	3.00¢		2.52¢	2.465¢
SPRING STEEL, C-R															
0.26 to 0.50 carbon	3.05¢			3.05¢			(Worcester=3.25¢)								
0.51 to 0.75 carbon	4.65¢			4.65¢			(Worcester=4.85¢)								
0.76 to 1.00 carbon	6.65¢			6.65¢			(Worcester=6.85¢)								
1.01 to 1.25 carbon	9.03¢			9.03¢			(Worcester=9.23¢)								
WIRE [9]															
Bright[12]	3.05¢	3.05¢		3.05¢	3.05¢		(Worcester=3.15¢)			(Duluth=3.10¢)		3.55¢			3.37¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	3.65¢	3.65¢		3.65¢			(Worcester=3.75¢)					4.15¢			3.97¢
PILING															
Steel sheet	2.65¢	2.65¢				2.65¢						3.20¢			2.97¢

CORROSION AND HEAT RESISTANT STEELS

in cents per pound, f.o.b. basing point

BASING POINT — All prices have been increased by 8.2 pct	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt	21 25	20 40	15.725	16.15	19 125	23 375
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	21 25	20.40	15.725	16 15	19 125	23.375
Billets, P'gh, Chi, Canton, Newark, N. J., Watervliet, Syracuse, Balt	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Newark, N. J., Ft. Wayne, Titusville	21.25	20.40	15.725	16.15	19 125	23.375
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	25 00	24 00	18.50	19.00	22 50	27.50
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft Wayne, Watervliet	25 00	24 00	18 50	19 00	22 50	27 50
Plates, P'gh, Middletown, Canton	29 00	27 00	21 50	22 00	26 50	30 50
Shapes, structural P'gh, Chi	25 00	24 00	18 50	19 00	22 50	27 50
Sheets, P'gh, Chi, Middletown, Canton, Balt	36 00	34 00	26 50	29 00	32 50	38 50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	23 50	21 50	17 00	17 50	24 00	35 00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	30 00	28 00	22 00	22 50	32 00	52 00
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila	25 00	24 00	18 50	19 00	22 50	27 50
Wire flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	30 00	28 00	22 00	22 50	32 00	52.00
Rod, h-r, Newark, N. J., Syracuse	25 00	24 00	18.50	19 00	22.50	27.50
Tubing, seamless P'gh, Chi, Canton, (4 in. to 6 in.)	66.63	66.63	.....	63.30	.....	.....

SHELL STEEL

	per gross ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic openhearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.00 higher; East Michigan, $3 higher.

Price Exceptions: Follansbee Steel Corp. permitted to sell at $13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of $52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	3.90¢
Armature	4.25¢
Electrical	4.75¢
Motor	5.425¢
Dynamo	6.125¢
Transformer 72	6.625¢
Transformer 65	7.625¢
Transformer 58	8.125¢
Transformer 52	8.925¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb No. 1 O.H., net ton	$43.59
Angle splice bars, 100 lb	2.85
(F.o.b. basing points)	*per net ton*
Light rails (from billets)	$49.18
Light rails (from rail steel)	48.29
	base per lb
Cut spikes	3.65¢
Screw spikes	5.55¢
Tie plate, steel	2.55¢
Tie plates, Pacific Coast	2.70¢
Track bolts	4.75¢
Track bolts, heat treated, to railroads	5.00¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk, *Also Canton, O.)*
An increase of 8.2 pct applies to extras

	base per lb
High speed	72.5¢
Straight molybdenum	58.4¢
Tungsten-molybdenum	62.2¢
High-carbon-chromium*	46.5¢
Oil hardening*	26.0¢
Special carbon*	23.8¢
Extra carbon*	19.5¢
Regular carbon*	15.2¢

Warehouse prices east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa.	18.72*	13.76
Nickel-clad 10 pct, f.o.b. Coatesville, Pa.	18.72	....
Inconel-clad 10 pct, f.o.b. Coatesville	26.00	.....
Monel-clad 10 pct, f.o.b. Coatesville	24.96	....
Aluminized steel Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	base per keg	
Standard wire nails	$3.25	$3.75
Coated nails	3.25	3.75
Cut nails, carloads	3.85	....
	base per 100 lb	
Annealed fence wire	$3.50	$4.00
Annealed galv. fence wire	3.85	4.35
	base column	
Woven wire fence*	72	90
Fence posts, carloads	74	91
Single loop bale ties††	72	97
Galvanized barbed wire**	79	89
Twisted barbless wire	79	89

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

††Add 50¢ a ton.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$8.50	$17.00
15-lb coating I.C.	9.50	19.00
20-lb coating I.C.	10.00	20.00

ALLOY EXTRAS

Alloy Steel	Basic Openhearth		Electric Furnace	
	Bars and Bar-strip	Billets, Blooms and Slabs	Bars and Bar-strip	Billets, Blooms and Slabs
NE 8600	0.676¢	$13.52	1.196¢	$23.92
NE 8700	0.728	14.56	1.248	24.96
NE 9400	0.780	15.60	1.300	26.00
NE 9700	0.676	13.52	1.196	23.92
NE 9800	1.352	27.04	1.872	37.44
NE 9900	1.248	24.96	1.612	32.24

The extras shown are in addition to the base price of $2.808 per 100 lb on finished products and $56.16 per gross ton on semifinished steel, major basing points, as shown in table, opposite page, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. When acid openhearth is specified and acceptable, add to **basic openhearth alloy differential 0.26¢ per lb for bars and bar-strip and $5.20** per gross ton for billets, blooms and slabs.

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe) base price—$200.00 per net ton

Steel (buttweld)

	Black	Galv.
⅛-in.	60½	48
¼-in.	63½	52
1-in. to 3-in.	65½	54½

Wrought Iron (buttweld)

⅛-in.	18	+4
¼-in.	24	2½
1-in. and 1¼-in.	28½	9
1½-in.	33	12
2-in.	32	11

Steel (lapweld)

2-in.	58	46½
2½-in. and 3-in.	61	49½
3½-in. to 6-in.	63	51½

Wrought Iron (lapweld)

2-in.	25	4½
2½-in. to 3½-in.	26	7
4-in.	28	11
4½-in. to 8-in.	27	10

Steel (butt, extra strong, plain ends)

⅛-in.	58½	47½
¼-in.	62½	51½
1-in. to 3-in.	64	54

Wrought Iron (same as above)

⅛-in.	19	+1⅓
¼-in.	25	4½
1-in. to 2-in.	33	13

Steel (lap, extra strong, plain ends)

2-in.	56	45½
2½-in. and 3-in.	60	49½
3½-in. to 6-in.	63½	53

Wrought Iron (same as above)

2-in.	28	8½
2½-in. to 4-in.	34	16
4½-in. to 6-in.	32	14½

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or $2 a ton higher on all buttweld.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots

	Seamless Cold-Drawn	Hot-Rolled	Lap-weld, Hot-Rolled
2 in. O.D. 13 B.W.G.	16.52	13.90	13.20
2½ in. O.D. 12 B.W.G.	22.21	18.70	17.67
3 in. O.D. 12 B.W.G.	24.71	20.79	19.56
3½ in. O.D. 11 B.W.G.	31.18	26.25	24.68
4 in. O.D. 10 B.W.G.	38.68	32.56	30.55

(Extras for less carload quantities)

40,000 lb or ft and over.....Base
30,000 lb or ft to 39,999 lb or ft....5 pct
20,000 lb or ft to 29,999 lb or ft....10 pct
10,000 lb or ft to 19,999 lb or ft....20 pct
5,000 lb or ft to 9,999 lb or ft....30 pct
2,000 lb or ft or 4,999 lb or ft....45 pct
Under 2,000 lb or ft.....65 pct

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago....$60.80
6-in. and larger, del'd New York... 60.20
6-in. and larger, Birmingham..... 52.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles or Seattle 74.00

For all rail shipment; rail and water shipment less.

Class "A" and gas pipe, $3 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

Percent Off List

½ in. & smaller x 6 in. & shorter....65½
9/16 & ⅝ in. x 6 in. & shorter.....63½
¾ to 1 in. x 6 in. & shorter.....61
1⅛ in. and larger, all lengths.....59
All diameters over 6 in. long.....59
Lag, all sizes.....62
Plow bolts.....65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller.....62
9/16 to 1 in. inclusive.....59
1⅛ to 1½ in. inclusive.....57
1⅝ in. and larger.....56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 in. through 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 pct additional discount.

Stove Bolts

Consumer

Packages, nuts loose.....71 and 10
In packages.....71
In bulk.....80

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

(½ in. and larger)

Base per 100 Lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham.....$3.75

Small Rivets

(7/16 in. and smaller)

Percent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham.....65 and 5

Cap and Set Screws	*Consumer Percent Off List*
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes.	36
Fillister head cap, listed sizes.	51

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Div. certifies in writing the consumers need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, cents per lb, ton lots.

Copper, electrolytic, 150 and 200 mesh.....21½¢ to 23½¢
Copper, reduced, 150 and 200 mesh.....20½¢ to 25½¢
Iron, commercial, 100 and 200 mesh 96 + % Fe.....12½¢ to 15¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots.....4¢
Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots.....63¢
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe 30 to 33¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe.....42¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe.....90¢
Aluminum, 100 and 200 mesh.....*25¢
Antimony, 100 mesh.....30¢
Cadmium, 100 mesh.....$1.40
Chromium, 100 mesh and finer....$1.25
Lead, 100, 200 & 300 mesh....11½ to 15¢
Manganese.....65¢
Nickel, 150 mesh.....51½¢
Solder powder, 100 mesh..8½¢ plus metal
Tin, 100 mesh.....58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb.....$2.60
Molybdenum powder, 99%, in 200-lb kegs, f.o.b. York, Pa., per lb...$2.60
Under 100 lb.....$3.00

*Freight allowed east of Mississippi.

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$7.50*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	9.00
Foundry, Byproduct	
Chicago, del'd	13.75
Chicago, f.o.b.	13.00
New England, del'd	14.65
Kearny, N. J., f.o.b.	13.05
Philadelphia, del'd	13.28
Buffalo, del'd	13.40
Portsmouth, Ohio, f.o.b.	11.50
Painesville, Ohio, f.o.b.	12.15
Erie, del'd	13.15
Cleveland, del'd	13.20
Cincinnati, del'd	13.25
St. Louis, del'd	13.75†
Birmingham, del'd	10.90

*Hand drawn ovens using trucked coal permitted to charge $8.60 per ton plus transportation charges.

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of $14.25 in the St. Louis, Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick*	*Per 1000*
Super-Duty brick, St. Louis	$76.05
First quality, Pa., Md., Ky., Mo., Ill.	60.40
First quality, New Jersey	65.90
Sec. quality, Pa., Md., Ky., Mo., Ill.	54.80
Sec. quality, New Jersey	57.70
No. 1 Ohio	50.00
Ground fire clay, net ton	8.95

Silica Brick*	
Pennsylvania and Birmingham	$60.40
Chicago District	69.30
Silica cement, net ton (Eastern)	10.60

Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00

Magnesite Brick	
Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite	
Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$43.48
Domestic, f.o.b. Chewelah, Wash. in bulk	22.00
in sacks	26.00

*Retroactive to Apr. 1.

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports*)

Per Gross Ton

Old range, bessemer, 51.50.....$4.95
Old range, non-bessemer, 51.50....4.80
Mesaba, bessemer, 51.50.....4.70
Mesaba, non-bessemer, 51.50.....4.55
High phosphorus, 51.50.....4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

WAREHOUSE PRICES*

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
**Philadelphia	$3.518	$4.872[5]	$4.868a	$3.922	$4.772	$3.605	$3.666	$3.822	$4.172	$5.816	$6.866	$7.072	$8.172
New York	3.58	4.613	5.210	3.974[6]	4.772	3.768	3.758	3.853	4.203	5.858	6.908	7.103	8.203
Boston	3.744	4.744[9]	5.324[9]	4.108	4.715	3.912	3.912	4.044	4.244	6.012	7.062	7.194	8.394
Baltimore	3.394	4.852	4.994	3.902	4.752	3.594	3.759	3.802	4.152	....	....	....	....
Norfolk	3.771	4.965	5.471	4.165	4.865	3.971	4.002	4.065	4.265	....	....	....	....
Chicago	3.25	4.20	5.331	3.60	4.65[17]	3.55	3.55	3.50	3.85	5.80	6.65	6.85	7.75
Milwaukee	3.387	4.337	5.372	3.737	4.787[17]	3.687	3.687	3.637	3.987	5.837	6.887	6.887	8.137
Cleveland	3.35	4.40	4.977	3.60	4.45[17]	3 40	3.588	3.35	3.85	5.806	6.856	6.65	7.75
Buffalo	3.35	4.40	4.85	3.819	4.669	3.63	3 40	3.35	3.85	5.60	6.65	6 65	7.75
Detroit	3.45	4.50	5.10	3.70	4.659[17]	3 609	3.661	3.45	3.90	5.93	6.98	6.959	8.059
Cincinnati	3.425	4.475	4.925[5]	3.675	4.711	3.661	3.691	3.611	4.111	5.95	7.00	7.011	8 261
St Louis	3.397	4.347	5.231	3.747	4.931[17]	3.697	3.697	3.647	4.131	5.981	7.031	7.031	8 131
Pittsburgh	3.35	4.40	4.85	3.60	4.45	3.40	3.40	3 35	3.85	5.60	6.65	6.65	7.75
St. Paul	3.50	4.46	5.357	3.86	5.102[17]	3.813	3.813	3.763	3.461	5.94	5.99	7.361	8.461
Omaha	3.865	5.443	5.615	4.143	....	4.093	4 093	4.043	4.543	....	....	....	....
Indianapolis	3.52	4.568	5.018	3.768	4.741	3.63	3.63	3.58	4.08	5.93	6.98	6.98	8.23
Birmingham	3.45	....	4.85	3.70	....	3.55	3.55	3.65	4.53	....	....	....	....
Memphis	3.965	4.78	5.365	4.215	....	4.065	4.065	4.015	4.33	....	....	....	....
New Orleans	4.058*	5.079	5.458	4.308	....	4.158	4.158*	4.108*	4.729	....	....	....	....
Houston	3.763	5.573	6.413[1]	4.313	....	4.25	4 25	3.75	6.473[3]	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20	6.20	4.95	5.613[15]	4.95	4.65	4.40	5.683	8.204	9.404	9.304	10 454
San Francisco	4.55[14]	7.30[4]	6.45	4.50[14]	7.333[17]	4.65[14]	4.35[14]	4.15[14]	5.433	8.304	9.404	9.404	10.454
Seattle	4.65[12]	7.05[4]	6.05	4.25[12]	....	4.75[12]	4.45[12]	4.35[12]	5 783	....	9.404	....	....
Portland	4.65[11]	6.60[4]	5.85	4.75[11]	....	4.75[11]	4.45[11]	4.45[11]	5.633	8.304	9.404	8.304	9.404
Salt Lake City	4.530[17]	....	6.27[13]	5.53[17]	....	4.98[17]	4.98[17]	4.88[17]	6.00	....	....	....	....

*Until new detailed warehouse prices are reported by distributors, no change will be made in the prices above. However, OPA says recent steel price adjustments may be added to the prices quoted here.

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-FINISHED: Sheets, 400 to 1499 lb; strip, extras on all quantities; bars, 1500 lb base.

GALVANIZED: 450 to 1499 lb.

NE ALLOY BARS: 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 800 to 4999 lb. (12) 800 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb and over. (15) 1000 lb and over. (16) 1500 lb and over. (17) 2000 lb and over. (18) 3500 lb and over.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on add-e quotations.

*Add 0.271¢ for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Maximum per gross ton, effective Mar. 15, 1946.
Prices do not reflect 3 pct tax on freight.

BASING POINT PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	27.00	27.50	28.00	28.50	....
Birdsboro	27.00	27.50	28.00	28.50	32.00
Birmingham	21.50	22.88	....	27.50	....
Buffalo	25.50	26.50	27.00	27.50	32.00
Chicago	26.00	26.50	26.50	27.00	....
Cleveland	26.00	26.50	26.50	27.00	....
Detroit	26.00	26.50	26.50	27.00	....
Duluth	26.50	27.00	27.00	27.50	....
Erie	26.00	26.50	27.00	27.50	....
Everett	27.00	27.50	28.00	28.50	....
Granite City	26.00	26.50	26.50	27.00	....
Hamilton	26.00	26.50	26.50	....	....
Neville Island	26.00	26.50	26.50	27.00	....
Provo	24.00	24.50	....	....	....
Sharpsville[1]	26.00	26.50	26.50	27.00	....
Sparrows Point	27.00	27.50	....	....	....
Steelton	27.00	....	....	....	32.00
Swedeland	27.00	27.50	28.00	28.50	....
Toledo	26.00	26.50	26.50	27.00	....
Youngstown	26.00	26.50	26.50	27.00	....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	0.50	27.50	28.00	28.50	29.00	....
Boston	Birdsboro-Steelton	4.02	....	....	....	....	36.02
Brooklyn	Bethlehem	2.50	29.50	30.00	30.50	31.00	....
Brooklyn	Birdsboro	2.92	....	....	....	....	34.92
Canton	Clev Ygstn, Sharpsvil	1.39	27.39	27.89	27.89	28.39	....
Canton	Buffalo	3.19	....	....	....	....	35.19
Cincinnati	Birmingham	4.06	25.56	26.94	....	....	....
Cincinnati	Hamilton	1.11	....	....	27.61	....	....
Cincinnati	Buffalo	4.40	....	....	....	....	36.40
Jersey City	Bethlehem	1.53	28.53	29.03	29.53	30.03	....
Jersey City	Birdsboro	1.94	....	....	....	....	33.94
Los Angeles	Provo	4.95	28.95	29.45	....	....	....
Los Angeles	Buffalo	15.41	....	....	....	....	47.41
Mansfield	Cleveland-Toledo	1.94	27.94	28.44	28.44	28.94	....
Mansfield	Buffalo	3.38	....	....	....	....	35.38
Philadelphia	Swedeland	0.84	27.84	28.34	28.84	29.34	....
Philadelphia	Birdsboro	1.24	....	....	....	....	33.24
San Francisco	Provo	4.95	28.95	29.45	....	....	....
San Francisco	Buffalo	15.41	....	....	....	....	47.41
Seattle	Provo	4.95	28.95	29.45	....	....	....
Seattle	Buffalo	15.41	....	....	....	....	47.41
St. Louis	Granite City	0.50	26.50	27.00	27.00	27.50	....
St. Louis	Buffalo	7.07	....	....	....	....	39.07

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace, by order L 39 to RPS 10. Apr. 11, 1945, retroactive to Mar. 7, 1945. Delivered to Chicago, $42.34. High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorous content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. Effective Mar. 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron and bessemer ferrosilicon up to and including 14.00 pct silicon covered by RPS 10 as amended. Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$32.00; f.o.b. Buffalo—$33.25. Add $1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	6.05¢	6.30¢	6.60¢
Ton lots	6.65¢	7.55¢	8.55¢
Less ton lots	6.80¢	7.80¢	8.80¢

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50
F.o.b. Pittsburgh, Chicago	40.00	

Manganese Metal

Contract basis, lump size, per pound of metal, f.o.b. shipping point, freight allowed.

96-98% Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30¢
L.c.l. lots	32¢

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	34¢
Ton lots	36¢
Less ton lots	38¢

Low-Carbon Ferromanganese

Contract price per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.10% max. C, 0.06% P, 90% Mn	21.00¢	21.40¢	21.65¢
0.10% max. C, 1% max. Si	20.50¢	20.90¢	21.15¢
0.15% max. C, 1% max. Si	20.00¢	20.40¢	20.65¢
0.30% max. C, 1% max. Si	19.50¢	19.90¢	20.15¢
0.50% max. C, 1% max. Si	19.00¢	19.40¢	19.65¢
0.75% max. C, 7.00% max. Si	16.00¢	16.40¢	16.65¢

Silicomanganese

Contract basis, lump size, per pound of metal, f.o.b. shipping point, freight allowed. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05¢
Ton lots	6.70¢
Briquet, contract basis, carlots, bulk, freight allowed, per lb. of briquet	5.80¢
Ton lots	6.30¢
Less ton lots	6.55¢

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $48.75 f.o.b. Keokuk, Iowa: $46.75 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%. Covered by MPR 405.

Silicon Metal

Contract price per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots, packed.

	Eastern	Central	Western
96% Si, 2% Fe	13.10¢	13.55¢	16.50¢
97% Si, 1% Fe	13.45¢	13.90¢	16.80¢

Ferrosilicon Briquets

Contract price per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination. 40% Si.

	Eastern	Central	Western
Carload, bulk	3.35¢	3.50¢	3.65¢
Ton lots	3.80¢	4.20¢	4.25¢

Electric Ferrosilicon

Contract price per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
50% Si	6.65¢	7.10¢	7.25¢
75% Si	8.05¢	8.20¢	8.75¢
80-90% Si	8.90¢	9.05¢	9.55¢
90-95% Si	11.05¢	11.20¢	11.65¢

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00¢	23.40¢	24.00¢
0.10% C	22.50¢	22.90¢	23.50¢
0.15% C	22.00¢	22.40¢	23.00¢
0.20% C	21.50¢	21.90¢	22.50¢
0.50% C	21.00¢	21.40¢	22.00¢
1.00% C	20.50¢	20.90¢	21.50¢
2.00% C	19.50¢	19.90¢	20.50¢
66-71% Cr, 4-10% C	13.00¢	13.40¢	14.00¢
62-66% Cr, 5-7% C	13.50¢	13.90¢	14.50¢

Briquets—contract price per pound of briquet, f.o.b. shipping point, freight allowed. 60% chromium.

	Eastern	Central	Western
Carload, bulk	8.25¢	8.55¢	8.95¢
Ton lots	8.75¢	9.25¢	10.75¢
Less ton lots	9.00¢	9.50¢	11.00¢

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2c per lb to regular low-carbon ferrochrome price schedule. Add 2c for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5c per lb to regular high-carbon ferrochrome price schedule.

S. M. Ferrochrome

Contract price per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	14.00	14.40	15.00
Ton lots	14.90	15.55	16.75
Less ton lots	15.40	16.05	17.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25 max. C.

	Eastern	Central	Western
Carload	20.00	20.40	21.00
Ton lots	21.00	21.65	22.85
Less ton lots	22.00	22.65	23.85

Chromium Metal

Contract prices per pound, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Chromium—Copper

Contract price per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si.

Shot or ingot	45¢

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	13.00	13.50	15.55
Ton lots	14.50	15.25	17.40
Less ton lots	15.50	16.25	18.40

Calcium—Manganese—Silicon

Contract prices per pound of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50¢	16.00¢	18.05¢
Ton lots	16.50¢	17.35¢	19.10¢
Less ton lots	17.00¢	17.85¢	19.60¢

Calcium Metal

Eastern zone contract prices per pound of metal, f.o.b. shipping point, freight allowed. Add 1¢ for central zone; 5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.35	$1.75	$4.25
Less ton lots	1.60	2.00	5.00

CMSZ

Contract price per pound of alloy, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.			
Ton lots	12.00¢	12.75¢	14.75¢
Less ton lots	12.50¢	13.25¢	15.25¢
Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.			
Ton lots	11.75¢	12.50¢	14.50¢
Less ton lots	12.25¢	13.00¢	15.00¢

SMZ

Contract price per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.

	Eastern	Central	Western
Ton lots	12.00¢	12.85¢	14.60¢
Less ton lots	12.50¢	13.35¢	15.10¢

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ X down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed	$1.83
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V...	
Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5	$1.10
Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10%C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads	$142.50
Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, Electrolytic, 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	95¢
Calcium molybdate, 40-45¢, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	14¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	4.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload	5.75¢
Ton lots	7.25¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound.	
Car lots	8.00¢
Ton lots	8.75¢
Less ton lots	9.25¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed. Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1445

Silcaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	25¢
Ton lots	26¢
Silvaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	58¢
Ton lots	59¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.	
No. 1	87.5¢
No. 6	60¢
No. 79	45¢
Bortram, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb.	
Ton lots	$2.25
Less ton lots	$2.30

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Weekly Gallup Polls

(CONTINUED FROM PAGE 103)

ment and a policy of insisting that Russia stick to her agreements, a coast-to-coast survey indicates.

The views of the people were sounded by field reporters for the institute during the period Mar. 15 to 24, which was before the opening of the UNO Security Council meeting in New York and during a period when the crisis over Iran and Manchuria was boiling. On Mar. 22 Stalin relieved the tension somewhat by his statement affirming his faith in the UNO.

Voters from coast to coast were asked two questions in the survey. The first was:

"In general, do you approve or disapprove of the policy Russia is following in world affairs?"

	Pct
Approve	7
Disapprove	71
No opinion	22

The second question was:

"If Russia continues her present course what should we do, if anything?"

Those favoring a show of firmness in one form or another constituted by far the largest group, as the following table shows:

	Pct	
Be firm, make her stick to agreements, no appeasements	44	50
Don't send money or materials, cut off lend-lease	5	
Sever relations with her	1	
Go before the UNO	8	16
Get together and work things out	7	
Try to appease Russia	1	
Do nothing, let her go, avoid trouble	12	
Miscellaneous and no opinion	22	

While desiring a firm policy toward Russia, American voters with opinions on the subject are not in favor of taking the step which Churchill proposed—a fraternal association or partnership between the United States and Britain, which might have the effect of acting as a check on Russian moves.

When the country was questioned about Churchill's suggestion, made in his Fulton, Mo., address, approximately seven in every ten (68 pct) said they had heard about or read what he said in his speech. Those people were

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asked to state their opinion of it.

18 pct said they approved his idea, thought it was right.
4 pct said U. S. and Britain should stick together, but have no military alliance.
40 pct said they disapproved of Churchill's suggestion.
6 pct expressed no opinion.

68 pct

Among those who disapproved were some who said that it would cause jealousy and distrust, that Britain depends too much on us now, that we should have no military alliance with anyone, and that all disagreements should be worked out in the UNO.

The London Economist

(CONTINUED FROM PAGE 107)

to getting on with the Russians. They traded horses at Potsdam and didn't like what they got. Next "Jimmy" went off to the London ministerial conference in September, determined to be "firm." He was firm and came home pleased with the empty results only to find that failure was, at that moment, unpopular in Washington. So in December he tried for results at Moscow and came back pleased with those results. Comparable pleasure did not exist at the White House. By the time he got back he was being called an "appeaser," and his work "another Munich." He cleared himself temporarily with the President, but in his annoyance he failed to knock at all the White House doors. By the time of the UNO session in London he was beginning to get "orders" from the President and rumors were popping everywhere in Washington that he was on the way out. In a series of official "get tough" speeches, Mr. Byrnes' contribution was notable for its balance. This was the period of the Churchill speech and of reported plans for a massive American fleet steaming to Istanbul. Mr. Byrnes made his speech dutifully, but he would have none of the Fulton trip. It is reasonable to suppose that if the Churchill speech had produced a humbled Moscow Mr. Byrnes would have bowed off the diplomatic stage.

But such is the nature of coincidences that Mr. Byrnes emerged as

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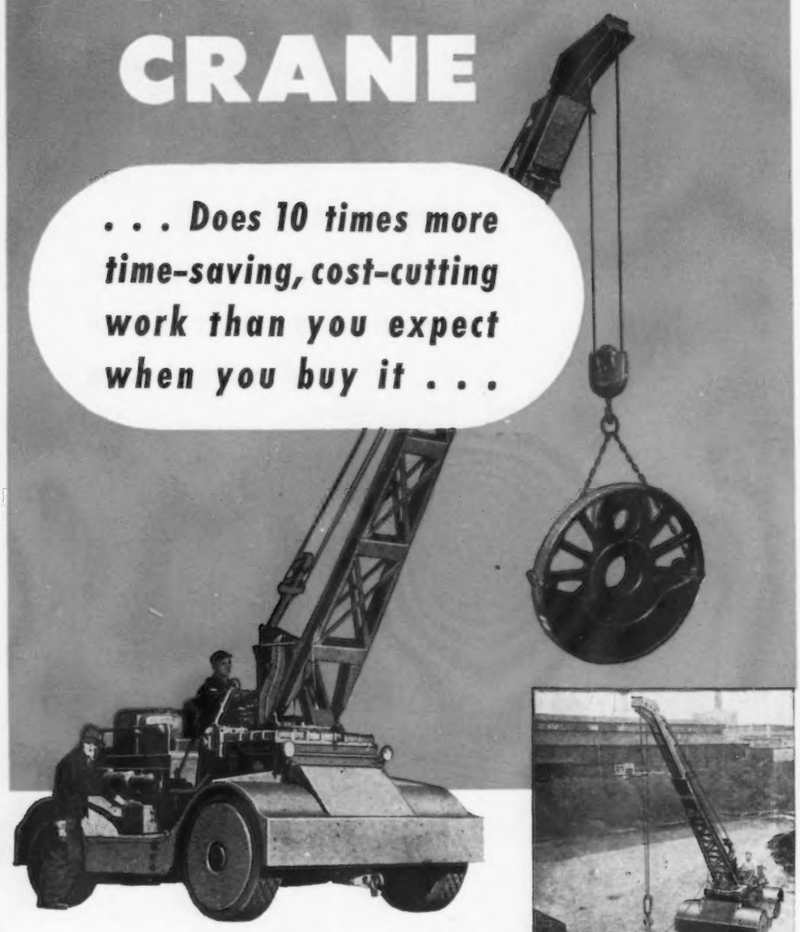

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the man of the hour for the very reasons which had made him unpopular after Moscow. Because of this record, just because his attitude towards Russia had always been at variance with the popular mood of the moment, he was safe alike from the anti-Russian and pro-Russian labels. And, most particularly, he had freed himself from the anti-Russian one just when the times called for a man with that freedom. The education of "Jimmy" Byrnes had progressed at precisely the right psychological moment to the point where he was in a perfect middle position, though it is open to doubt that Generalissimo Stalin drafted his retort to Mr. Churchill with the good of Mr. Byrnes foremost in mind.

IN another article in the same issue, the Economist writes:

It would be logical to deduce that the demand put to Persia for an oil concession is but part of the same pursuit of additional resources. So it may be. But if so, why seek an end so reasonable by hectoring means which have annoyed and antagonized world opinion? No one stands between Russia and North Persian concessions. The oil-bearing areas there lie to the Caspian side of the Zagros mountains and belong, geologically and structurally, to the Caspian—that is, Russian-operated—oil area, and not to the great fields of the Gulf and Middle East. The American company —Amiranian—which prospected there in 1936 and 1937, abandoned its rights because transport to the Persian Gulf was not economic. A Russo-Persian oil company—the Khurian Co.—has been at work in the region since 1925, but has only drilled two wells. It found no result, and never extended its efforts, but to all appearances, nothing would have been easier than for Moscow to withdraw its troops as promised and then to amplify or replace the Khurian concession.

The only conceivable explanation why it did not proceed in this way lies in fear of the British—or, more accurately, the Anglo-Saxon—economic hold on the Persian Gulf (and, therefore, at least potentially, on the Persian Government) and in anxiety lest this should develop into a drive north-

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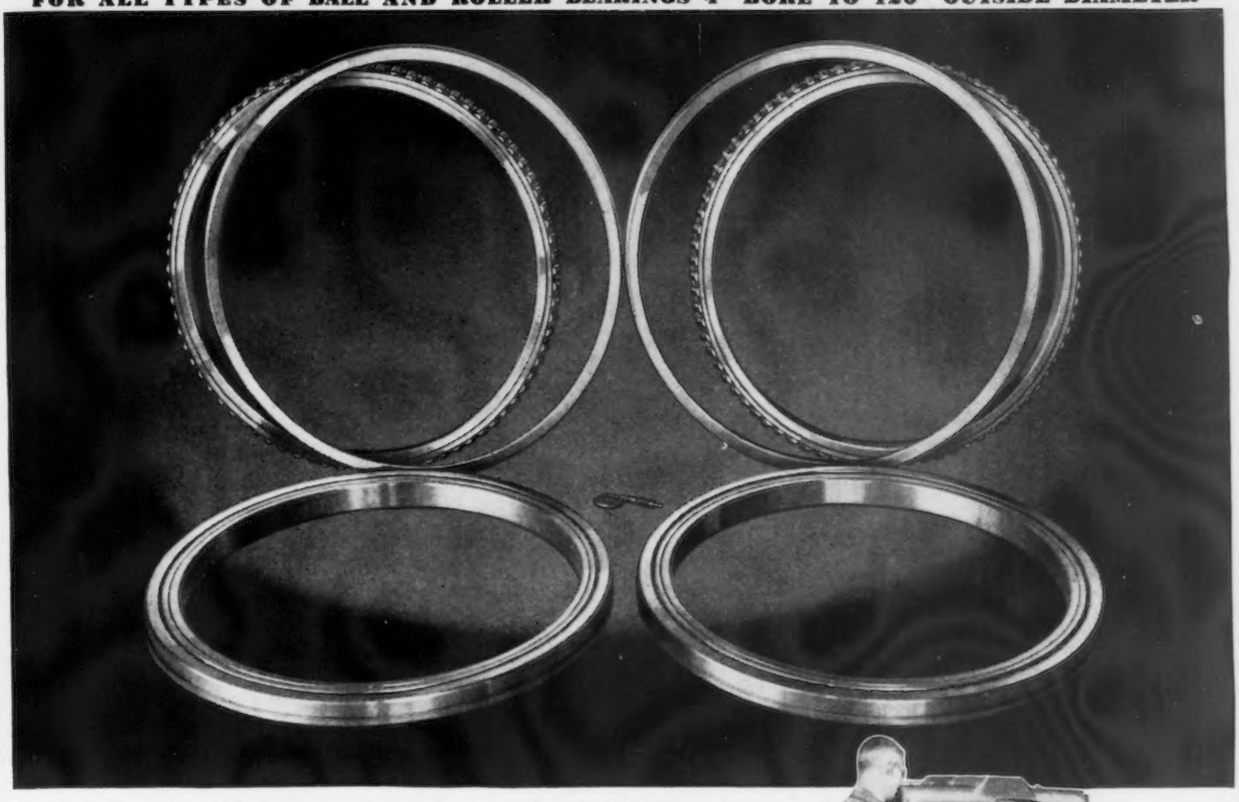

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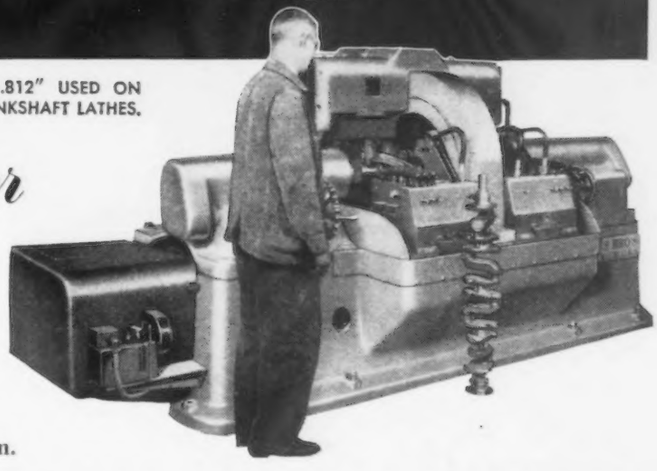

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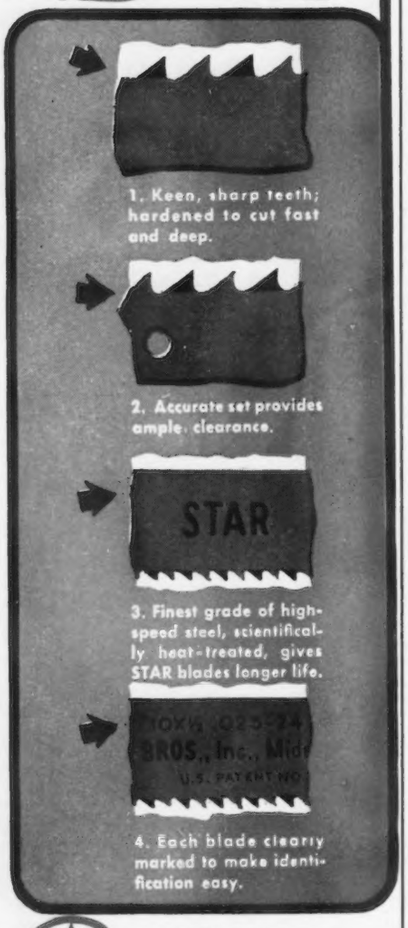
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wards and a threat to Baku. It appears that the Russians accordingly tried to grasp the concession ahead of time, first in 1944, and secondly upon the expiry of their rightful term of occupation this year.

It must be confessed that Anglo-American oil activities in 1944 gave a naturally suspicious ally some grounds for nervousness. Mr. Ickes was on the warpath about the exhaustion of American reserves, and was full of plans for Middle East expansion. In Washington, Lord Beaverbrook was negotiating an oil convention (subsequently still-born) containing rules governing world oil supplies in the interests of collective security. In South Persia the British and Americans had asked for an extension of existing concessions. When Persia refused to accord them new rights during the occupation, they dropped their request. But, a little later, fresh fears of an Anglo-Saxon advance were awakened by the Persian Government's employment of two American experts, Mr. Hoover and Mr. Curtis, to survey the potential oil resources throughout the country in order to advise on the forming of a standard contract for postwar concessions. Such was the unfortunate background to Russia's first peremptory demand for an immediate concession —that which the Majlis with some temerity withstood in September 1944. In February 1946, there were no similar grounds for suspicion. The American troops had gone, the British were going. And yet the request for an oil concession was once more leveled at the Persians to an accompaniment of threats.

If these are the only two objectives—if Russia wants no more in northern Persia than Britain already has in southern Persia—is not the right course to further the claim by all legitimate assistance now?

To suggest this course is not to claim that it will mend the crack in UNO's fabric. Only Marshal Stalin can do that. But to submit a proposal to the Kremlin on these lines between now and Apr. 10 might conceivably open the way to a settlement of the Persian problem, and would also provide that touchstone of Russian purposes of which the outside world stands so badly in need.

Westland Expedites Possible Sources Of High Grade Iron Ore

Cleveland

• • • **Possibility of a new source of high grade iron ore at the head of Lake Huron is being expedited by the Westland Mining Co., according to James W. Ferguson, president, who announced that capital for drilling had been obtained recently.**

Samples taken from the deposits and assayed by the Provincial Dept. of Mines show the hematite ore is considerably about 60 pct iron, or about 20 pct higher than the average of the ores being mined in the Lake Superior district.

If development of the deposits fulfills Mr. Ferguson's expectations, Westland Mining Co. will have the closest source of iron ore to the Chicago and Lake Erie steel producing centers. It was estimated that the new mines will be about a 36-hr haul for the ore freighters to the docks at this end.

Westland Mining Co.'s claims are in the Algoma district, 40 miles back of the port of Blind River, Ont., and 80 miles east to Sault Ste. Marie. Up to the present, about $35,000 has been spent on the property, which is underlain northeasterly by conglomerate, greywacke and argillite of the Gowganda formation, with folded beds in the observed outcrops and having a general trend east and west. The southwestern portion of the property is underlain white Lorrain quartzite formation. The contact between the Gowganda formation and the Lorrain quartzite is located in low area northwesterly from Stringer lake and is covered by glacial drift.

According to the Westland Mining Co.'s prospectus, minor faults are seen in the quartzite where exposed close to contact area and indicate considerable major faulting along the contact. Large bodies of diabase intrude the sediments and outcrop between the Gowganda formation and quartzite, although boundaries of the diabase bodies are generally concealed by drift material, they are probably more extensive than are apparent by observation at this time.

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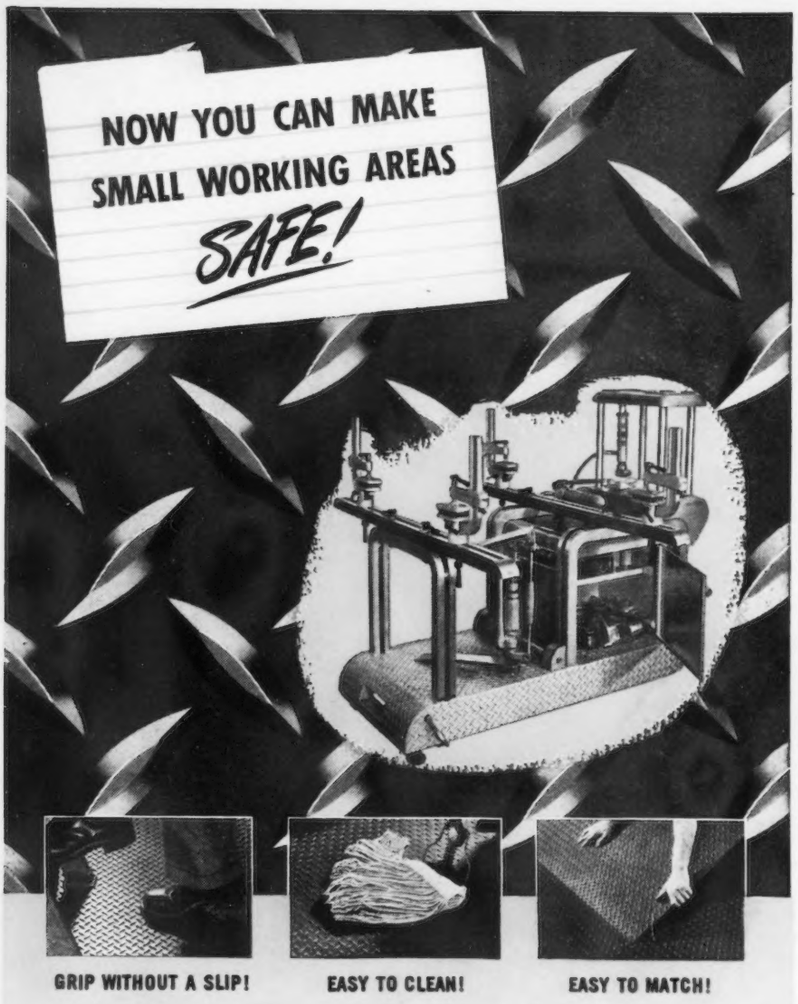

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occur in the Lorrain quartzite, they are fissure fillings and replacement elements in the faults. The veins and replacements in the area being developed consist of quartzite and hematite. The latter were not intimately mixed with the quartzite concentrate in veins of hematite and is the most potential feature of commercial interest. Soft hematite (paint rock) replacement vein filling has been encountered in the fault area, and the deposits consist of secondary quartzite and hematite, the latter being foremost part crystalline specularite.

No pyrite or other deleterious elements have been revealed by the limited analysis to date. The material in the veins has the quality of high grade premium iron ore. The hematite veins are believed to be of hydrathermal solutions, rising from a deep seated source.

Principal developments to date consist of surface stripping and rock trenching at the fault area, extending generally northwest from Stringer Lake for a length of approximately 4000 ft. The area covered by the 18 claims is being thoroughly explored in a systematic manner and the results of this surface work permit a planned diamond drill program to probe the depth, width and lateral extension of known surface veins.

Both open pit and shaft methods will be used to take out the ore, according to reports and a railroad will have to be built. However, Mr. Ferguson believes that diamond drilling so far has indicated the existence of at least 25 million tons of ore on the Westland Mining Co.'s property.

British Coal Production Up

London

• • • **It has been announced** that the production of coal in Great Britain for February 1946 amounted to 15,670,600 net tons, showing an increase of 951,700 tons on the January output. This total is only 358,400 tons less than the February 1945 production figure.

More shifts were worked per man, but the increase is attributable to a marked rise in the average output per manshift worked. At the coal face this was 3.09 tons, against 3.05 tons in January this year and 3.01 tons in February 1945. The Scottish region made the biggest contribution.

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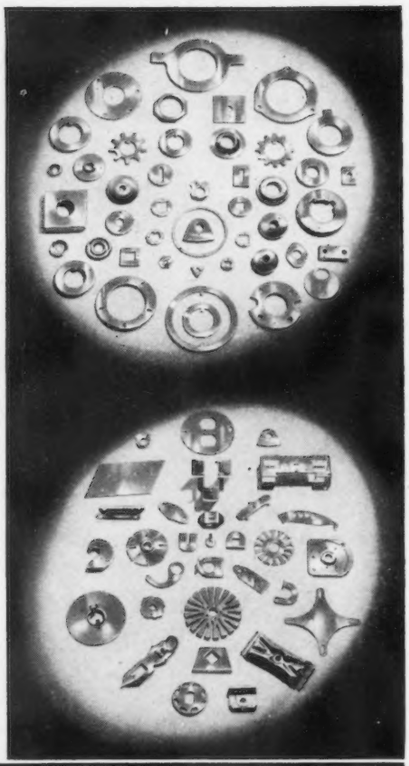

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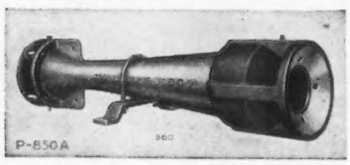

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Unprecedented Sales Predicted for Farm Implement Industry

Toronto

• • • **Reviewing developments** in the agricultural implement industry, J. S. Duncan, president of Massey Harris Co., Ltd., stated that there is an unprecedented demand throughout the world for farm implements because of the greatly improved financial position of the farmers, the world shortage of foodstuffs, the insufficient supply of farm machinery during the war years and the great quantities of machinery required for the countries of war-torn Europe. Mr. Duncan continued:

"Two major problems seriously affect our current operations and the future outlook, namely, the disruption of production schedules resulting from labor unrest in the plants of United States suppliers and the fact that the application of price ceilings has presented the adjustment of selling prices to meet rapidly increasing costs. Production problems are greater at present than at any time during the most critical periods of the war. Our manufacturing schedules, already delayed by overall shortage of certain basic raw materials, have been further upset by work stoppages and slowdowns aggravated by the steel and other major strikes affecting our supplies. The company, however, has taken aggressive steps to counteract the unfavorable consequences of these conditions on our own production, and although costs will be adversely affected, yet as a result, schedules will not be retarded to the extent that would otherwise be the case.

"The inability to have our selling prices in Canada and the United States adjusted to reflect greatly increased and increasing costs since the basic periods of 1941-42 has caused some concern. It was at all times obvious that with the return to regular activities, having in mind the very low margins on which the implement industry as a whole operates, relief by means of price increases is imperative. The increase in labor rates and in the costs of many of the raw materials, purchased parts and assemblies, is such as to far outweigh any advantages

which accrue from larger volume, and the policy of price ceilings will require to be adjusted to take cognizance of these changing conditions if the industry is to continue on a sound basis.

"We have been at all times favorable to price control, but to have been wholly successful it would have been necessary that price ceilings, as established, be maintained right across the board. This not having been done, costs have been steadily increasing, whereas selling prices such as those for farm implements have been maintained at basic period levels. Applications have been made both in Canada and the United States to have selling prices increased."

Massey Harris has embarked upon a broad program of modernization of plant and equipment to enable it to cope with the increasingly competitive conditions with which the industry is confronted and lower manufacturing costs are an inescapable necessity. In connection with this program $3,142,346 was expended during 1945. A modern mechanized foundry was constructed in Brantford and work has been started on a new plant in Toronto for mass production and assembly of harvesting combines. New power plant facilities also were provided at Toronto, and in addition, extensive purchases were made of modern machine tools and equipment for United States and Canadian plants.

Plan Improvement Program

Toronto

• • • **Canadian Pacific** Railway Co. has announced a program of expenditures of $15,750,000 on improvement to tracks and equipment from Fort William east to the Atlantic seaboard. Bridges will be renewed or strengthened to carry the heavier and more modern locomotives now being delivered to the company. Some 365 miles of new rail will be laid and there will be an expenditure of $3,200,000 for rails, tie-plates, rail anchors and modern switches with hydraulic buckles.

In addition to the various other improvements, the company will purchase new labor saving equipment such as bulldozers, snow handling and loading equipment, electric tie-tampers and cranes.

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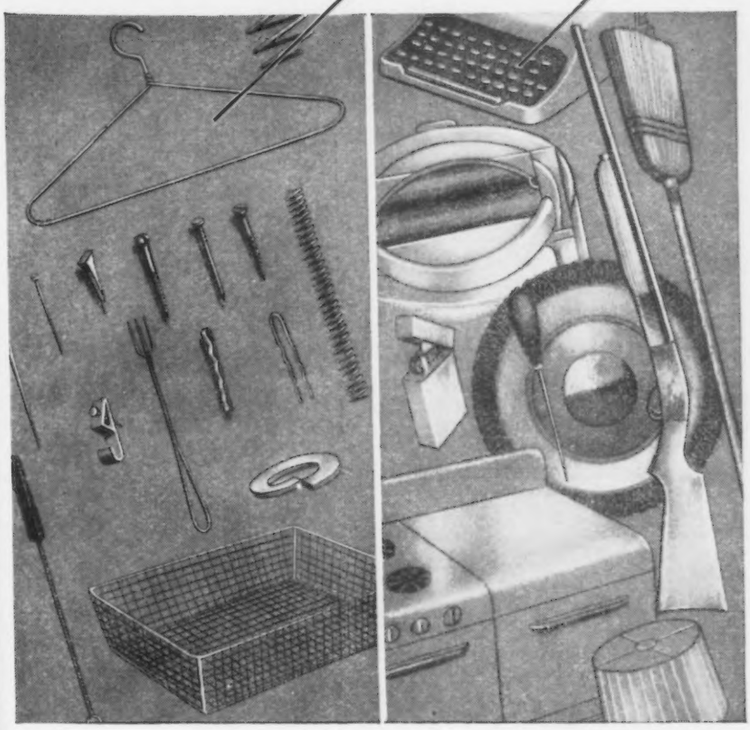

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WAA Plans Disposition Of Surplus War Plants Valued at $1 Billion

Washington

• • • **In line with an** announced policy of liquidating war surpluses as quickly as possible, War Assets Administration has placed on the block for sale or lease upwards of $1 billion worth of additional surplus war plants.

Facilities offered for quick disposal include the Strom ball bearing plant at Cicero, Ill.; Pittsburgh's iron ore reduction plant at Charleston, S. C.; and Aluminum's forging plant at New Castle, Pa.

Other plants up for sale or lease include:

Two International magnesium properties: the $4 million plant at Carlsbad, N. Mex., and the $15 million plant at Austin, Tex., which processed the Carlsbad output.

The supplemental facilities (machine shop and foundry extension) of the Chambersburg steel foundry, Chambersburg, Pa.

A $39 million tank and gun carriage factory at Grand Blanc, Mich.

The Van der Horst "chrome-hardening" plant in the Lakewood section, Cleveland.

The Bendix No. 2 aircraft parts plant at Philadelphia.

The Camfield electrical equipment factory at Grand Haven, Mich.

A $7 million aluminum and magnesium extrusion and forging plant operated by Revere at Halethorpe, near Baltimore.

The Revere copper and brass tube plant at Baltimore.

A $13½ million aluminum reclamation plant near Mobile, Ala.

The aluminum extrusion plant operated by the Bohn Corp., at Adrian, Mich.

The $14 million aluminum ingot and forging plant operated by Aluminum Co. at Monroe, Mich.

A magnesium and ferro-silicon plant at Spokane, Wash.

General information is obtainable from WAA in Washington or specific information from the WAA regional office nearest the particular property.

Slight Improvement Noted in Industrial Output in U. S. Zone

Berlin

• • • **There has been some** improvement in industrial production in the American zone of Germany during the past two months, due largely to increased availability of electric power and improved cooperation and coordination between the zones. There has still been no resumption of the flow of basic raw materials into the production sequence in most industries.

Major problems today for the reconstruction of Germany are coal, steel and chemical production, financial arrangements, interzonal exchange and transportation. Coal production remains at the top of the list despite the fact that as far as the American zone is concerned production is at the 1938 capacity rate today.

No other industries even approach this record and coal production in the British zone, where the most important mines are located has leveled off at 40 pct of the prewar output of hard coal. Having reached this figure in October, production has been sustained at the level until about three weeks ago, when the drastic cut in British zone rations began to make serious inroads on the coal output.

Output of steel in the American zone remained infinitesimal during January and February. Production at the Maximilianhuette at Haidhof rose to 6600 metric tons in January from 5100 in December and 5813 metric tons in November. In February, however, due to a breakdown of one furnace production at this works dropped to 4400 metric tons.

Rolling mill production in the American zone amounted to 3200 metric tons in February, having dropped from 3500 tons in the previous month due to the short month.

Iron and steel casting production during January and February amounted to about 8000 metric tons per month, doubled the December 1945 rate. This represents about 16 pct of existing capacity. The castings are being made primarily for repairs and maintenance work of all kinds. It seems likely that two additional cupolas for the production of cast iron heating boilers and radiators will go into production. The units involved will prob-

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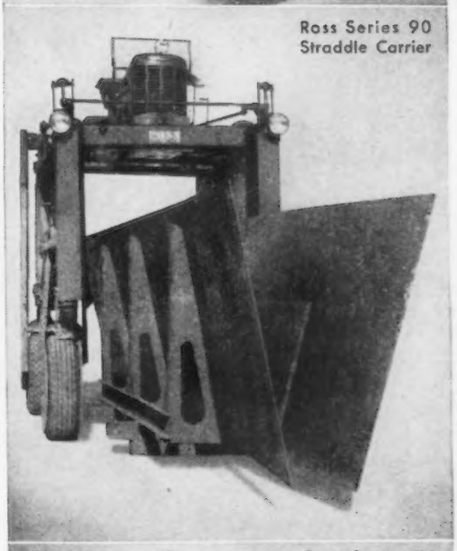
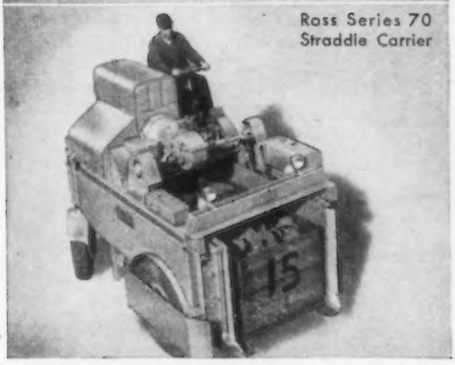


Ross Series 90 Straddle Carrier



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COATED? EVERY BIT OF ME!

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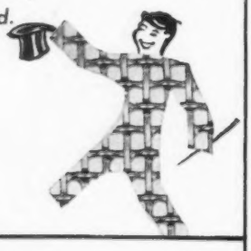
AM I SMOOTH? AM I BRIGHT?

I'll say I am! I've just the right amount of zinc. Not too much. That would cause "points". Not too little. That would cause "pitting". Brother, I'm Controlled.



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ably be at the Buderus Iron Works at Lollar.

Forgings and stampings amounted to 1750 metric tons during February, the same as for the three previous months.

After accumulating for some weeks an adequate supply of coal and coke, a blast furnace has been blown in at the Buderus Works in Greater Hesse. The first furnace to start iron making has a capacity of 3000 tons, but is not expected to reach that rate for several months.

Rolling mills at the Roechling Buderus Works are now being readied for production of rods and bars from 16,000 metric tons of ingots and semifinished material which is in stock at the mill. Production was planned at 500 tons per month and the mill was to be ready in March. The Sulzbach Rosenberg mill is also back in operation with a working stock of 10,000 tons of coal on hand.

Production of iron ore in the American zone during February amounted to 8625 tons compared with 9700 metric tons in January. Ore shipments in February to the British zone amounted to 29,356 tons. The mines had at the beginning of the year a stock of 100,000 tones of ore and are using the stockpile to pad out shipments to the Mannesmann Works in the Ruhr.

Ore mining operations in the Lahn-Dill area are expected to improve since sufficient electric power can be produced from coal fired boilers at Oberscheld.

Total production of finished steel products are scheduled to amount to 597,600 metric tons for the second quarter of 1946. This production should be broken up among the various zones. The steel production is completely maldistributed as far as the occupation is concerned, with 80 pct of prewar capacity in the British zone, 10 pct in the French zone, 7 pct in the American zone, and 3 pct in the Russian zone. The allocation to the American zone for the second quarter of this year is 125,300 metric tons, compared with 78,000 metric tons for the first quarter. In addition 30,000 tons of pig iron are being made available for iron castings.

Despite the methodical manner in which needs are estimated and allocations announced on the basis of the urgency of requirements, deliveries are slow, and finished prod-

ucts scheduled to arrive in December are just now finding their way to the users.

SECOND QUARTER FINISHED STEEL PRODUCTION AND ALLOCATIONS IN GERMANY

Receiving Zone	Production Tons	Production Pct	Allocations Tons	Allocations Pct
Total	597,600	100	597,600	100
British	478,000	80	328,700	55
U. S.	44,000	7	125,300	21
Soviet	15,600	3	90,000	15
France	60,000	10	53,600	9

There has been a slight increase in the volume of production in the 923 plants engaged in some phase of machinery and equipment manufacture. Progress has been substantial in production of agricultural implements, with production mounting from 1800 tons in December to 2100 metric tons in January, and 3100 tons in February. This last figure represents 14 pct of the U. S. zone capacity as of Feb. 1939, and only 31 pct of U. S. zone requirements.

The production of a few trucks each month which had been bolstering the still faltering transport system has bogged down as predicted as the stockpiles of steel and other raw materials have been depleted. Production in February amounted to only 74 units, representing a drop of 201 from the previous month.

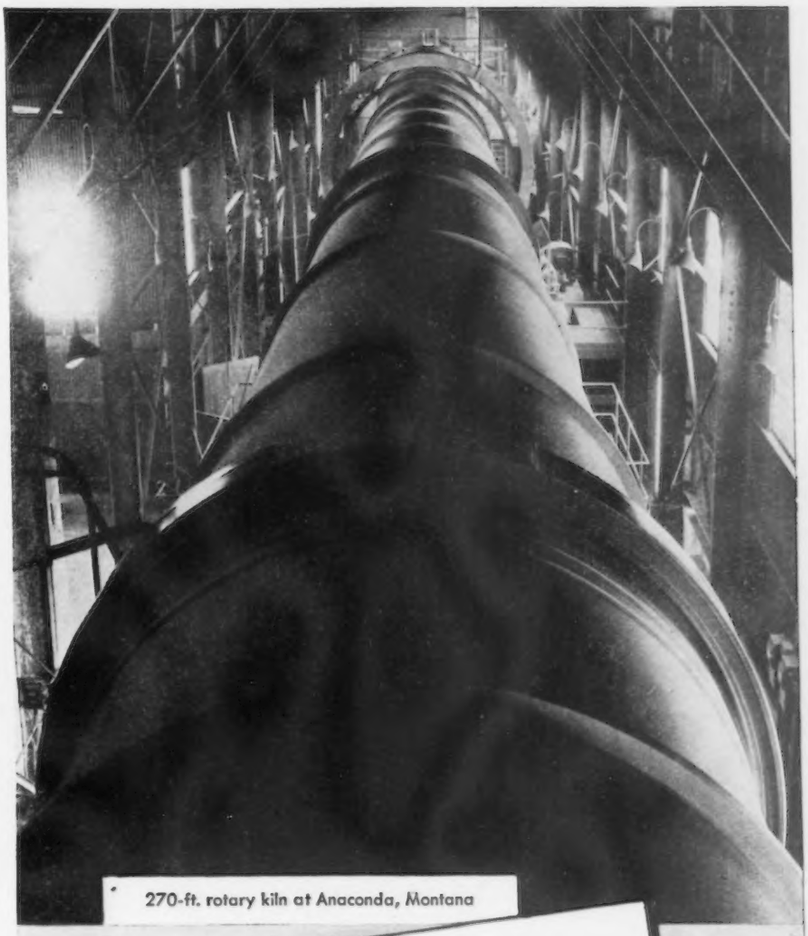
An effort is being made by American authorities to give further aid to Germany by renting 3000 trucks that are mostly in an unserviceable state to the civil authorities. They in turn rebuild the trucks, if and when spare parts are available. The Hessische Industrie Works at Kassel can rebuild 350 trucks a month on this program.

Speeds Transport Plan

London

• • • **The British Government** is now going ahead with a transport plan to benefit the public and traders. It has on hand a program for the building of 50,000 railway wagons in addition to those being built by the railway companies. Production will be spread over 5 yr, and it is hoped that the first 10,000 will be delivered by the end of this year.

Last year the government's road haulage organization handled 61,600,000 tons of goods, representing 1,512,000 tons more than in 1944, which included invasion traffic. In February this year the loads included 49,280 tons of prefabricated houses.



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Al_2O_3	0.76%
Fe	3.1%
P	0.06%

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Republic Steel Corp. Acquires Iron Ore Properties in Mexico

Cleveland

• • • **Republic Steel Corp.,** reporting net earnings of $9,543,443 for 1945, has acquired extensive iron ore properties in Mexico which could be used to advantage by its southern plants, Gulfsteel Works at Gadsden, Ala., and Thomas Works at Birmingham.

In their annual letter to stockholders, T. M. Girdler, chairman of Republic Steel Corp., and C. M. White, president, pointed out that with the exhaustion of free shipping iron ore in the Lake Superior region now confronting the industry, Republic had some years ago entered the northern New York iron ore field and developed mines which are producing at the rate of a million tons of ore annually.

The report showed gross sales and operating revenue for 1945 of $500,815,000. Net earnings are at the rate of $1.36 per share of common stock. Federal taxes on income amounted to $15,952,608. For the first six months of 1945, sales were eight pct higher and for the last six months, 20 pct lower than they were in the same periods in 1944, with total sales amounting to $531,235,000.

"It is the policy of Republic," the company's executives said, "to furnish steel to our customers on the basis of their prewar purchases and this policy is also rigidly adhered to so far as our own manufacturing divisions are concerned. In 1946 we will be unable to meet the demand for cold-rolled sheets from the automotive, refrigerator and other industries."

•

National Nets $11 Million

Pittsburgh

• • • **Net earnings** during 1945 of National Steel Corp., amounted to $11,117,764 after charging off the unamortized cost of war emergency facilities applicable to the period Jan. 1, 1945 to Sept. 30, 1945, in the amount of $5,496,948. These earnings compared with earnings of 1944 that totalled $10,751,369. Earnings in 1945 were 4.09 pct of sales, the lowest ratios in many years and less than half the average of 9.64 pct for the prewar

CONTINUED ON PAGE 147

Information Free

(1) Electrical Equipment:

The major products of the company are covered in detail in this bulletin. These include transformers for sixteen fields of application, ballasts, fuses, fustats, plug fuses and solenoids. *Jefferson Electric Co.*

(2) Totally Enclosed Motors:

A complete description of the Sealed-power motor, an ac, totally enclosed, fan cooled motor, used in dusty locations and where there is excessive moisture, is given in this booklet together with a cutaway view and pictures of six typical applications. *Joshua Hendy Iron Works, Crocker-Wheeler Div.*

(3) Presses and Bulldozers:

Details of construction of the company's bending presses and bulldozers are illustrated and tables of dimensions and specifications are included in this catalog No. 2010-B. Data is also provided on special bed and ram designs. *Cleveland Crane & Engineering Co.*

(4) Forgings:

Catalog describes the company's facilities for forging, including a drop forge department, machine shop, pickling department, engineering department, steam hammer department and many others. Also covered is a discussion of technique of drop forging. *Kropp Forge Co.*

(5) Friction Material:

Folder describes various types of Gempco compressed metallic friction materials designed to improve clutch and brake performance. Various clutch and brake disc designs are shown and information is given on size and application. *The General Metals Powder Co.*

(6) Die Casting Lubricant:

Booklet offers information on the Die Slick lubricant for use on die casting dies. A new application for Die Slick as a lubricant is its uses on the cores, pinions and other movable parts of permanent molds. *G. W. Smith & Sons.*

(7) Aluminum Bronze Weldrod:

Industrial application charts lists industries in which Ampco-Trode coated aluminum bronze electrodes have been used, types of proven applications in these fields and recommended grade of bronze weldrod for each. *Ampco Metal, Inc.*

(8) Fasteners:

Book explains how screws and washers are made and contains many photographs of the various manufacturing operations involved. All the company's products are illustrated in detail and net prices are quoted. *Manufacturers Screw Products.*

(9) Metal Parts Production:

Catalog illustrates and describes new techniques and processes in fabricating and coloring metal products and assemblies. Also covered are many of the company's standard and special-order items. *L. F. Grammes & Sons, Inc.*

(10) Plating:

Booklet takes you through the company's plating shop, giving a clear picture of the workings of the shop. Emphasis is given to electroplated zinc coatings, cadmium plating and hard chromium plating. *The Acme Plating Co.*

(11) Stainless Steels:

New and broader applications of stainless steels in production of airplanes, ordnance parts and ships used during the war are related and pictured in this booklet. Also discussed is the growing use of Enduro in peacetime industries. *Republic Steel Corp.*

(12) Adapter Bushings:

New adapter bushings for attaching drills, taps and reamers to floating and other types of holders which are precision built throughout with tremendous gripping power are described herein. Adapter sets provide the machine shop with a complete range of bushing sizes for each tool holder. Folder contains a list of the sets together with prices. *H. C. Clatfelter Co.*

(13) Coolant Filter:

Bulletin describes a new coolant filter designed to remove abrasive and metallic particles from grinder coolant. It is a compact, replaceable-element type filter, applicable to unit machines or centralized system. *Cuno Engineering Corp.*

(14) Strainer Installations:

Six blue print charts show coolant and cutting oil strainer installations on over 40 machine tools. Also available is a new catalog illustrating and describing Strainco coolant strainer products. *Strainer Products Corp.*

(15) Collets:

A description and illustration of company's collets are given in this booklet. In addition to showing standard draw-in and push-out collets, the booklet also lists the new full-floating collet with interchangeable and replaceable jaws developed especially for handling hot-rolled stock. *Sutton Tool Co.*

(16) Finishing Materials:

Illustrated, 24-page industrial finishing reference manual on polishing, buffing and deburring. Booklet tells when and where to use what compositions, summarizes applications, and offers helpful suggestions for finishing of all types of metals, non-metals and plastics. *Industrial Finishing Div., Modiner Mfg. Co.*

(17) Airless Blast Cleaning:

Detailed information on four sizes of the Wheelabrator airless abrasive blast cleaning machines, including construction features, overall dimension drawings and specifications, is contained in catalog No. 214. In addition, sections are devoted to ventilation requirements, operating performance facts, installation photographs and a list of users of the equipment. *American Foundry Equipment Co.*

(18) Tap and Threading:

Manual covers 33 classifications of tap and thread forms in alphabetical order, profusely illustrated with diagrammatic drawings. Pipe threads, lubrication, three wire system of measurement, etc., are covered at length. Outstanding feature of the manual is the section devoted to lubrication. *Hy-Pro Tool Co.*

(19) Hack Saw Care:

Selection of the proper blades for cutting various metals, causes and cures of common blade difficulties, and hints on "How and how not to do it" are featured in new 30-page illustrated booklet entitled "Metal Cutting." Specifications and Star price lists are included. *Clemson Bros., Inc.*

(20) Columbium Alloy:

Lebanon Circle L 21, a columbium stabilized alloy for corrosion-resistant weldments is covered in data sheet. Illustrated sheet of parts cast for welding applications also contains chemical analysis and average physical properties of the alloy. *Lebanon Steel Foundry.*

NOTICE TO READERS: Your request for this information will be forwarded promptly to the manufacturer issuing the literature. The offer is good for only two months.

4/11/46

THE IRON AGE, New York 17, N. Y.

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INFORMATION FREE (Continued)

(21) Instruments and Switches:

Principle of operation and advantages of vibrating reed frequency meters and vacuum tube frequency meters as well as temperature indicators and galvanometers are featured in this folder. Instruments and tester switches are also discussed. *J-B-T Instruments, Inc.*

(22) Steel Treating:

Flame hardening, annealing, aerocasing, heat treating, bar stock treating and straightening are some of the subjects covered in this brochure accompanied with illustrations. Also featured is a hardness conversion table. *Lakeside Steel Improvement Co.*

(23) Thermosetting Plastics:

"Selecting the Right Thermosetting Molding Material" is the title of this profusely illustrated booklet designed for use of the foreman, molder, engineer, designer, executive, or plastics student to aid in their understanding of thermosetting molding plastics. *Bakelite Corp.*

(24) Properties of Plastics:

The Plastics Products file consists of a four-page chart giving physical, chemical and electrical properties of plastic material. Typical applications shown. *Molwerney Plastics Co.*

(25) Production Parts:

Folder describes Ex-Cell-O's facilities for manufacturing production parts and unit assemblies. Of special interest are photographs, showing the machinery used in parts output. The company is equipped to handle parts from rough stock to finished pieces. *Ex-Cell-O Corp.*

(26) Automatic Index Base:

Bulletin, "How to Increase Production, Improve Accuracy, Eliminate Manual Indexing with a Sundstrand Automatic Index Base," contains illustrations, description of specific applications, features and engineering data on the index base. *Sundstrand Machine Tool Co.*

(27) Arc Welders:

Descriptions of Zipper arc welders and their outstanding features highlighted in this folder. Machines, in 150 and 300 amps., are built for rugged use, and their balanced construction is said to make them easier to handle and easier to move in the shop. *Mid-States Equipment Corp.*

(28) Manual Plastic Molding:

"Midget molder," described in this bulletin, is a manually operated, plastics molding machine of the injection type for producing plastic shapes up to ¾ oz in weight. The design, based on the experiences of practical molders, permits quick and easy checking and testing of temperatures, materials and mold designs. *Van Dorn Iron Works Co.*

(29) Die Accessories:

Catalog No. 4 shows complete line of accessories for tool and die makers and machine shops. Charts list sizes of die springs and data pertaining to load and deflection and gives data on other accessories. *Die Supply Co.*

(30) Renewable Valve Parts:

Wall chart gives information on how to renew vital parts of brass and iron valves. Technique for renewing and replacing worn parts and information necessary for ordering new parts are discussed. *Reading-Pratt & Cady Div., American Chain & Cable Co.*

(31) Turret Punch Press:

Model R-5 turret punch press especially adapted for short run piercing of outlet and conduit boxes, metal enclosures, panels and sheet and plate work is described in bulletin No. 51. Construction details, typical applications and operating principles are discussed. *Wiedemann Machine Co.*

(32) Grab Bucket Cranes:

Construction details and various industrial applications of P & H grab bucket cranes are shown in this catalog. Particularly suited for handling all types of bulk materials, these cranes are widely used in metal working industries. *Harnischfeger Corp.*

(33) Dust Control Equipment:

Wet method dust control equipment, for the thorough removal of dust, fumes and odors from plant air, is described. Various units are illustrated including a portable, self-contained dust and fume collection system embodied in one compact unit. *Claude B. Schneible Co.*

(34) Electric Furnaces:

History of the Lectromelt electric melting furnaces, data on the standard sizes, melting rate and holding capacity are covered in this bulletin. Increased use of the direct arc type furnace, making it possible to pour billet size ingots so they can be rolled with one heating, and pages of specification data are also covered. *Pittsburgh Lectromelt Furnace Corp.*

(35) Leather Packings:

A table of standards governing the correct proportions and dimensions of leather packings for every purpose are given in this folder. Also included is a table of standard list prices. *Alexander Brothers.*

(36) Spray Nozzles:

Construction details and available sizes of spray nozzles for spray ponds, cooling ponds, cooling towers and for airconditioning and general industrial uses are illustrated in this catalog. Also shown are construction details of spray ponds. *Yarnall-Waring Co.*

(37) Cooling Machine Tools:

The Airtemp packaged liquid cooler described maintains machine tool lubricant at the desired temperature. The unit is self-contained and all switches and controls are mounted on the unit itself. *Chrysler Airtemp Div., Chrysler Corp.*

(38) Hydraulic Units:

To meet the requirements of various application, valves and pumps may be added to or subtracted from the L-type self-contained hydraulic units described in bulletin No. 302-U. Folder gives complete description and specifications of the units. *John S. Barnes Corp.*

(39) Electric Trucks:

Catalog showing the firm's complete line of industrial electric trucks is offered. Models include elevating platform type and also small carrying, high-lift or tiering and the telescoping type. *Wright-Hibbard Industrial Electric Truck Co.*

(40) Property Protection:

Plant protection in the form of wire fences, window guards and wire mesh partitions are discussed in this booklet. Suggestions on selection of proper fence are given. *Cyclone Fence Div. American Steel & Wire Co.*

(41) Thermocouple Data:

Charts containing temperature-millivolt calibration curves for most common thermocouple elements to aid in checking calculations when thermocouples are used with Wheelco pyrometers are given in this catalog. Extensive data on replacement thermocouples are also given. *Wheelco Instruments Co.*

(42) Die Cushions:

Data sheets give rules for finding die cushion size and ring holding pressure required when dimensions of the first drawn shells are available. General practice of figuring the size and capacity of pneumatic die cushions for a large percentage of inclinable presses is also discussed. *Dayton Rogers Mfg. Co.*

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(CONTINUED FROM PAGE 144)

years 1936 to 1941, inclusive. Sales in 1945 were $271,832,560, highest in the history of the organization.

An extensive construction program has been started by National Steel, which will result in numerous improvements and additions during the next two years. Among other things, the program includes additional power plant facilities, byproduct coke ovens, and additions and improvements to plants and equipment for the production of sheet, strip, and tin mill products. While the program is of considerable size, no new financing will be required.

J&L Reports Billings, Operations Drop in '45; Net Income Increases

Pittsburgh

• • • **In his annual message** to stockholders of Jones & Laughlin Steel Corp., H. E. Lewis, chairman, pointed out that while gross billings dropped from $290,087,880 in 1944 to $284,741,818 in 1945 and operations dropped from a rate of 101 pct in 1944 to 88 pct in 1945, net income increased from $7,966,663 in 1944 to $8,082,082 in 1945. Accelerated amortization adjustments together with a provision made by the corporation for possible wage inequities for 1944 and 1945 resulted in a substantial reduction in 1945 taxes and a claim for a refund of $10,174,000 of taxes paid for prior years.

Expenditures during 1945 for capital additions and improvements completed or in progress at the end of the year amounted to $12,056,014, including $1,714,124 for war facilities. Projects completed during the year included a battery of 106 byproduct coke ovens at Aliquippa Works, which added 708,000 net tons per year of coking capacity. On Dec. 31, 1945 the unexpended balance on uncompleted, authorized construction was about $17,000,000. Projects authorized but incomplete at the end of the year included a five-stand 42-in. tandem mill with pickling and other necessary facilities at Aliquippa for production of cold finished coils for tinplate. This installation will free the 54-in. tandem mill at the strip-sheet mill in Pittsburgh,

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THAT'S TH' BIGGEST STRAIN OF BEIN' TH' HEAD OF ANYTHING! TH' ONES WHO CAN'T GET ALONG WITHOUT YOU ARE TOO QUICK WITH TH' PULMOTOR, AN' TH' ONES THAT CAN'T GET ALONG WITH YOU ARE TOO QUICK WITH TH' STRETCHER!
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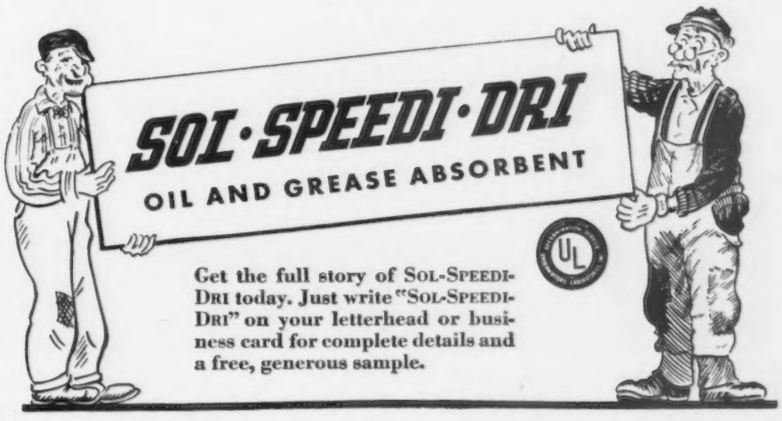
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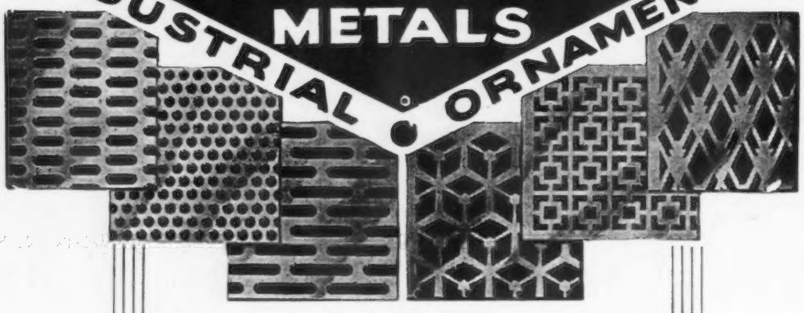

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which can then be used exclusively for the production of cold rolled sheets.

At Otis Works, an improvement program is underway to increase and improve cold-rolled sheet facilities. Another project in process will complete the program of coal cutting and loading mechanization at the coal mines. This will be completed late this year.

•

Armco's Earnings Top $9 Million in 1945

Middletown, Ohio

• • • **American Rolling** Mill Co. has reported consolidated net earnings of $9,414,647 for 1945, after taxes but before extraordinary and nonrecurring adjustments. Net, based on sales totaling $220,144,648, is equal to $2.58 per common share.

Sales of Rustless Iron & Steel, which was merged into Armco as of Dec. 31, were included in the 1945 total and were responsible for the increase over 1944 sales which amounted to $200,818,944. Extraordinary and nonrecurring adjustments of $3,977,549 increased net income to surplus to $13,392,196.

Charles R. Hook, president of Armco, said the increase in net profits was mainly the result of earnings of $1,302,503 on the company's share in ownership of Rustless Iron & Steel 1945 net profits which were included. Adjusted amortization of emergency facilities deducted for tax purposes during the year reduced taxes and correspondingly increased income by $2,525,000.

Earnings in 1944 before deduction for contingency reserves were $7,307,991, an equivalent to $1.84 per share.

•

Wheeling Earnings Down

• • • **Wheeling Steel Corp.** reported net profits for the year ended Dec. 31, 1945, after all charges including federal taxes were deducted, amounted to $3,950,252, which compares with net earnings for 1944 totalling $4,384,789. Sales for 1945 were the largest in the organization's history, totalling $143,154,065, which compared with $135,144,446 in the previous year. These included sales of about $27,000,000 in 1945 and $22,000,000 in

1944 of finished products, mostly for war uses, which were fabricated from materials not produced by the company or ordinarily used in its business.

The company during 1945 purchased two twin-screw diesel river tow boats to replace two river steam boats taken out of service; 587 acres of coal land were acquired; the hot strip finishing mill at Steubenville plant was enlarged; and railroad rolling stock was purchased. The cost of these additions was about $800,000, and another $2,800,000 was expended for other plant improvements. The obsolete Martins Ferry blast furnace was taken out of operation in June, 1945, and has been abandoned as an operation unit of the corporation. An option acquired from Carnegie-Illinois to purchase its Mingo Works for $2,500,000 has been exercised by Wheeling.

Appoints Members To British Motor Council

London

• • • **Mr. John Wilmot,** British Minister of Supply, has announced that the following members have been appointed to form the National Advisory Council for the motor manufacturing industry:

Mr. R. C. Rootes, deputy chairman of Rootes, Hillman Motor Car Co., and various motor companies.

Sir Miles Thomas, vice-chairman and a managing director of Morris Motors.

Mr. L. P. Lord, chairman and managing director of Austin Motor Co.

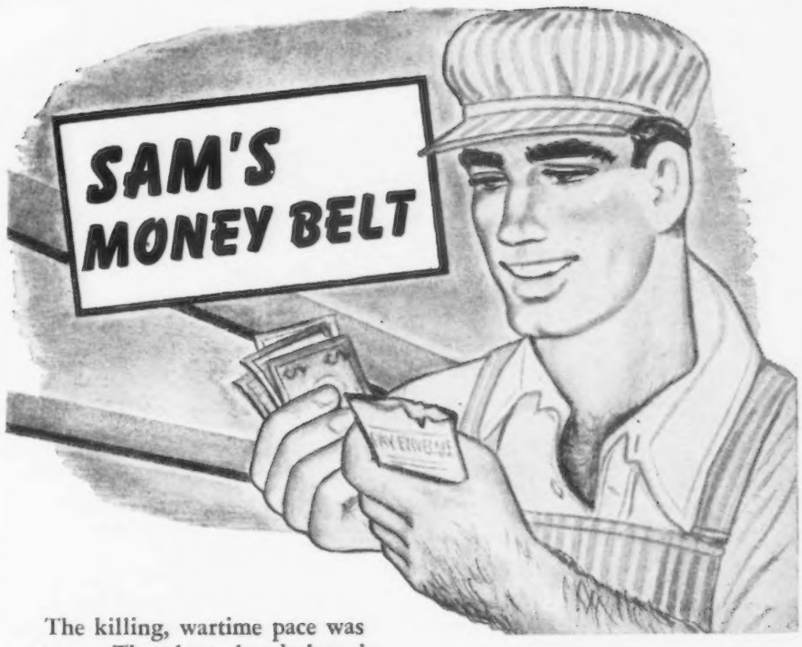
Mr. S. Wilks, managing director of the Rover Co.

Sir Charles Bartlett, managing director of Vauxhall Motors.

Sir Peter Bennett, M.P., chairman of C.A.V., and Joseph Lucas.

Messrs. R. F. Fryars, W. R. Black, G. Wansbrough, H. Halliwell and R. Openshaw.

There will also be an official representative from the Ministry of Supply and Aircraft Production, one from the Board of Trade and one from the Ministry of War Transport. The permanent secretary of Supply, Mr. O. S. Franks, will preside.



The killing, wartime pace was on . . . The plant already keyed to peak production . . . when an emergency government order came in! The Single Spindle Presses weren't built to handle 5/8" drills—the belt drive was lighter than the load demanded. But, the job was vital—and Sam got it out! The 1½" Duxbak Single Ply Belt on his drill press turned out to be a money belt for Sam. He produced more piecework per hour—collected more take-home pay. Other drill press operators saw it . . . insisted on Duxbak belts for their machines . . . got them—and everyone profited—Government, Management and Operator.

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Schieren Leather Belts are built to take it. Where other belts fail—due to wear, flexes, oil, water or other hazards—Schieren Leather Belts take the toughest conditions in stride. Their suction-like pulley grip delivers extra RPM—guarantees maximum power output. No more expensive than standard quality belts, Schieren Leather Belts pay for themselves over and again by minimizing costly shutdowns and reducing maintenance.

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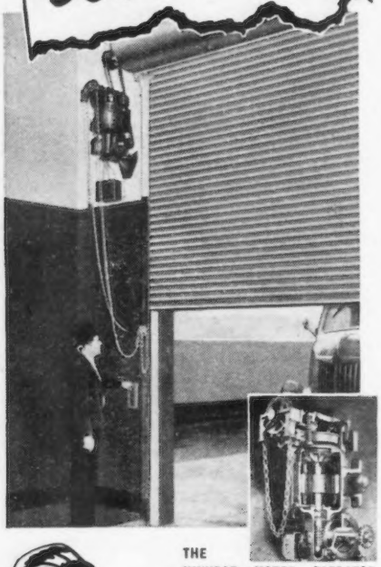

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Saving ways in Doorways

KINNEAR ROLLING DOORS

Warns Continued High Cost of Coal Hinders Exportation of Steel

London

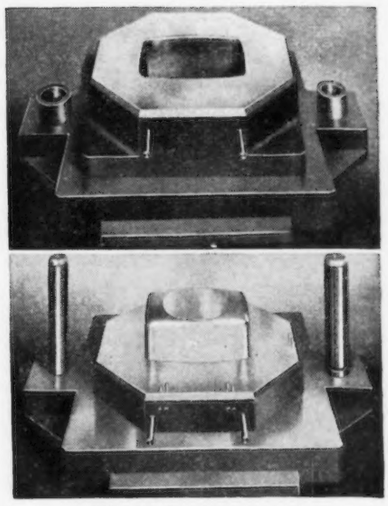
• • • At the annual general meeting of Dorman, Long & Co. Ltd., Viscount Greenwood, the chairman, warned that unless there is a marked reduction in the cost of obtaining coal the United Kingdom's iron and steel industry will continue to be at a serious disadvantage with competitors in the United States and elsewhere.

He pointed out that though free from violent disturbance the transition period from war to peace had presented many problems. The chief difficulties were connected with supplies of essential raw materials and transport. The company needed a much freer intake of foreign ores, and it was here that the transport factor made itself felt. Shortage of shipping had interfered with deliveries of ore and had retarded overseas shipments of finished products.

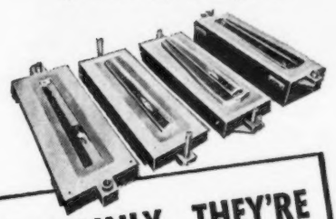
The difficult situation confronting the railways had added to the company's problems, and at times it has had to carry stocks of nearly 560,000 tons of finished steel against a normal 22,400 tons. Shortage of labor combined with various other inconveniences had caused the output of rolled steel to fall below 1,120,000 tons for the first time since 1935.

The company has decided to spend $32,000,000 on a new steel plant and universal beam mill. The mill which will have an annual capacity of 392,000 tons of universal beams will be the most modern of its kind in the world. The only possible way to secure the manufacture of universal beams of first class quality and at lowest possible cost is by concentration of production in a special purpose mill on the lines proposed. It would take 2 yr under the most favorable conditions to complete this project, and in order to carry through the plan expeditiously it would be necessary to obtain a considerable amount of rolling mill plant from the United States, and this would be contingent on the necessary dollars being made available. The plan is awaiting government approval and it is hoped that it will be given high priority.

Viscount Greenwood went on to



Punch and Blank Holder
Hood Top Forming Dies



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Motor car builders... Truck builders.. Tractor builders... Stove manufacturers . . . Grave Vault companies . , . Farm im plement people.

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say that the high price of coal is the largest single contributory factor in the price of steel, and continuous investigation and repeated checks of fuel consumption were being made to secure fuel economies. The nationalization of coal may seriously affect production, and the company's large reserves of coal are most valuable as an insurance of adequate supplies for its iron and steel works. The company's operations had been built up on the basis of regular supplies of coal, and any break in supplies would seriously prejudice production and prove very costly.

Dorman, Long had an important part to play in the immense tasks of reconstruction at home and abroad and they had every confidence in their capacity to make a considerable contribution. The circumstances called for increased production, and the steel industry can take a justifiable pride in the fact that it is the only industry which has put forward promptly and in detail a plan for reconstruction and expansion and has said it is prepared to finance the plan itself. No other industry has organized itself as an industry to this extent, and it is a measure of the steel industry's appreciation of the nation's postwar economic needs that it has taken these energetic steps in a long-term program.

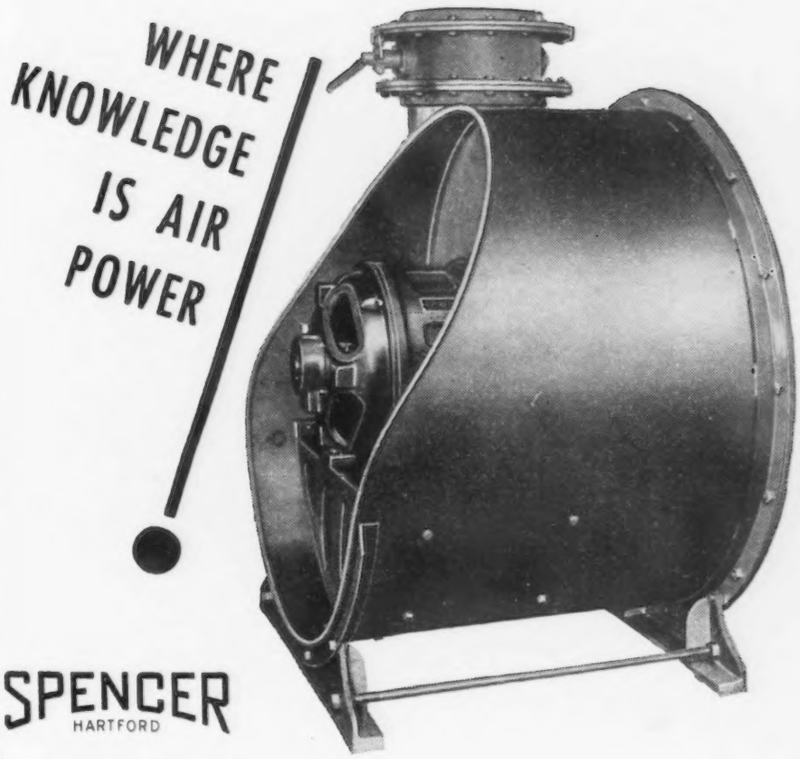
Plans Quick Output Of Prefabricated Houses

London

• • • **Aneurin Bevan,** British Minister of Health, has asked the larger towns in England and Wales to place contracts at once for the B.I.S.F. permanent prefabricated house, designed by the British Iron & Steel Federation. Plans for immediate production on a large scale have been made by the government, and delivery is expected to begin in May or June.

For the sake of speed a standard design has been adopted. The framework is steel and the upper part of the external cladding is of painted steel sheets. Accommodation comprises a working kitchen, dining recess, living room, three bedrooms, and bathroom, with a fuel store and shed.

The houses will be built by con-



Knowledge of design and air flow and experienced craftsmen, many of whom have been making Spencer Turbos for a quarter of a century, all contribute to the outstanding records of performance made by Spencer Turbos.

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As it is difficult to point out which is the most important leg of a three-legged stool, so it is hard to say which of these factors is the most vital... we know from experience that *all* are necessary. Proof of wire rope quality is in performance... why not find out for yourself just what "HERCULES" can do on your own job? Many who have made this test are now regular users.

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We believe that war demands made it possible for ELECTRO to show cooler cutting at higher speeds . . . and present high state of perfection will be the basis for further gains.

Most all sizes and types of Electro resin-bonded wheels are available from our Buffalo or Los Angeles Warehouses.

All we ask is opportunity to prove the cooler cutting at higher speeds of Electro Wheels. Tell us what you want to grind or cut-off and we will supply recommendations and prices. Newly printed Handbook-Catalog No. 645 is available.

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tractors who, in association with the federation, have formed a company called British Steel Houses, Ltd. If there is risk of a contract falling behind schedule, the contractors will, if necessary, enter into mutual aid pacts.

This type of house offers an opportunity of securing a substantial increase in the number of permanent houses which can be completed during the next 12 months, without prejudicing the programs of traditional houses.

Air Reduction Forms New Sales Division

New York

• • • **C. D'W. Gibson,** vice-president in charge of sales for Air Reduction Co., New York, has announced the organization of a new technical sales division of the firm.

Dr. Slottman

The new division, which replaces Airco's former applied engineering department, is headed by Dr. George V. Slottman, with the company 10 yr. He is a former professor of chemical engineering at M.I.T., and has done a great deal of work in the theory and application of gaseous combustion in steel mill operations in the United States and abroad.

Mr. Gibson also announced that S. D. Baumer and E. V. David, who have been assistant managers of the applied engineering dept., are assistant managers to Dr. Slottman in the new sales division.

Mr. David served with the Newport News and Federal shipbuilding companies, International General Electric, Hartford Steam Boiler, New York Steam, and government inspection services before going with Air Reduction in 1929.

Mr. Baumer has spent several years in grey iron and steel foundry production. He was with Bethlehem Steel for 14 yr, in both production and maintenance. He joined Air Reduction in 1941.

Gearing Developed For Gas Turbine Aircraft

Pittsburgh

• • • **Tests are being** conducted by Westinghouse Electric Corp., on a development destined to hasten output of a geared gas turbine powered commercial airplane. The new development, a compact, lightweight gear capable of reducing the 12,000 rpm speed of a large gas turbine to 1200 rpm at the propeller, was designed and built at the Nuttall Gearing Div. of Westinghouse.

Geared gas turbine airplanes, which harness the power of a turbine engine to turn a propeller instead of exhausting a high velocity jet into the atmosphere as do present jet planes, will have distinct advantages in economy and load-carrying ability, according to Folke Richardz, engineering manager of the gearing div.

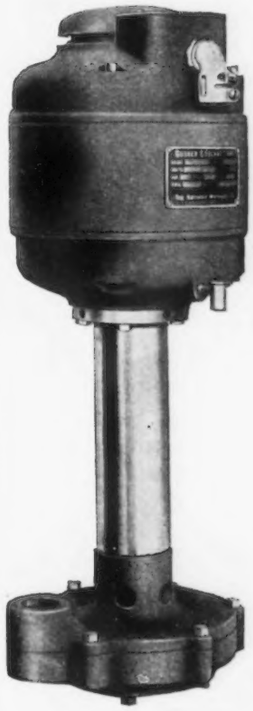
A gas turbine, if attached directly to a standard propeller would turn it at about 12,000 rpm. Tips of standard propeller blades on a whirling turbine shaft theoretically would move at the fantastic speed of 7200 mph, but the blades would be torn from the shaft long before such speeds were reached. Actually, propeller tip speed limitations are reached somewhat below the speed of sound, approximately 750 mph. Thus it becomes necessary to have a reduction gear which will add little to the overall weight of the plane but transmit power to the propeller at a speed reduction of 10 to 1. The new gear, including the propeller shaft support, weighs only about 1/30th as much per hp as an industrial gear.

This new gear is of the "sun and planet" type, the "sun" being a large gear wheel around which several "planets," or smaller gear wheels, rotate inside of a ring gear. The drive consists of one set of high speed planetary gearing that transmits its energy to a low speed planetary gear set all in the same housing.

Special carburized and nitrided steel are used in making the gears and they must be machined to an exceedingly high accuracy. Bearing and journal surfaces must be smoothly polished to a surface having an error of not more than

Specify

RUTHMAN GUSHER COOLANT PUMPS



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There is no guesswork when you specify Ruthman Gusher Coolant Pumps on your machine tools. You are assured of a coolant pump that is universally accepted by the leading machine tool builders and designers.

If you want a pump that will cut costs and raise production in your metal cutting operations, you should specify the proven and original Ruthman Gusher Coolant Pump.

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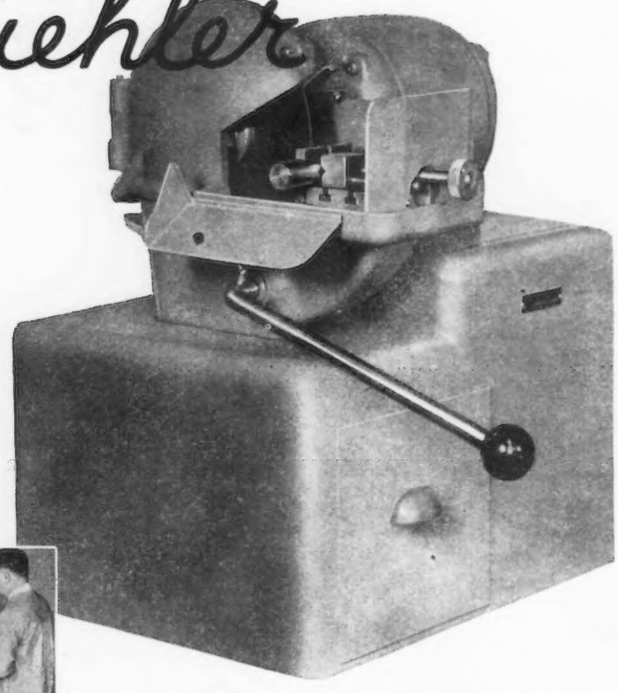
Buehler



TOP: Operates with maximum ease and convenience.

BOTTOM: No. 1016 AB recirculating cooling system.

The BUEHLER line of specimen preparation equipment includes

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ABRASIVE CUT-OFF MACHINE No. 1015

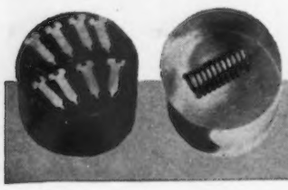
This new 1 h.p. cut-off machine is constructed with the usual Buehler emphasis on precision and ease of operation. It is a table mounted model, similar in design and performance to the larger cabinet model No. 1010. Coolant is supplied by a recirculating system comprising No. 1016 tank and hose connections.

This efficient cut-off machine occupies a minimum of space, is economical in cost, and has a capacity for cutting 1" stock. The No. 1015 cutter promises to be one of the most popular cut-off machines in the metallurgical field.

Specifications

1015 AB Cut-Off Machine, complete with wheel assembly and six 9" x 1/16" x 1¼" assorted cutting wheels, specimen table and vise. Motor 1 h.p. 220/440 volt, 60 cycles, AC, 3 phase, 3450 RPM, with electrical control. Complete with sludge trap of heavy pressed steel, with drawer and drain connections for cooling device. Directions included.....$275.00
Dimension 32" x 32" x 27". Shipping wt., 260 lbs.

1016 AB Recirculating Cooling System with heavy tank 19½" long x 12⅝" wide x 9¾" high divided into compartments with handles and cover with 1/30 h.p. 110 volts, 60 cycles, 1 phase motor directly connected to pump including intake and outlet hoses with control valve for 1015 Cutter.....$60.00
Dimensions 21" x 14" x 19". Shipping wt., 40 lbs.



Buehler Ltd.
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METALLURGICAL APPARATUS
165 West Wacker Drive, Chicago 1, Illinois

three to five millionths of an inch. The entire gear housing is of aluminum, to keep the assembly weight to a minimum.

In spite of the huge amount of power the gear transmits, the theoretical tooth contact stresses are no higher than those normally encountered in other aircraft-type gears. This factor can be attributed to careful attention to design details, according to Mr. Richardz. Lubrication of the gears is by pumps which force oil at high pressure.

A comparison of takeoff thrust of a jet plane, a geared gas turbine plane and a reciprocating engine plane, all of the same weight, shows a thrust of 24,000 lb for the jet plane, 28,000 lb for the reciprocating engine plane and 44,000 lb for the geared gas turbine plane. Top cruising range of the three types of planes is estimated at 4800 miles for the piston type, 3500 miles for the jet propelled and 6600 miles for the geared gas turbine with propeller.

•

Orders Fast Cargo Ships

London

• • • **Two fast passenger** and refrigerated cargo liners for their Australian and New Zealand trades have been ordered by Shaw Savill & Albion Ltd. One is to be built by Swan, Hunter & Wigham Richardson of Wallsend-on-Tyne, and the other by Cammell Laird & Co. at Birkenhead.

Each ship will be about 16,800 tons and have a normal service speed of 17 knots. Approximately 70 passengers will be carried in each ship, which will have over 500,000 cu ft refrigerated space and more than 210,000 cu ft for general cargo.

•

Steel for Baths, Cookers

London

• • • **Household baths** and cookers of pressed steel are to be produced in order to speed up the housing program, according to Aneurin Bevan, the Minister of Health.

He said that German prisoners of war were to be employed in brickworks where shortage of British workmen was acute, so that there would be an ample supply of bricks when the building season was in full swing.